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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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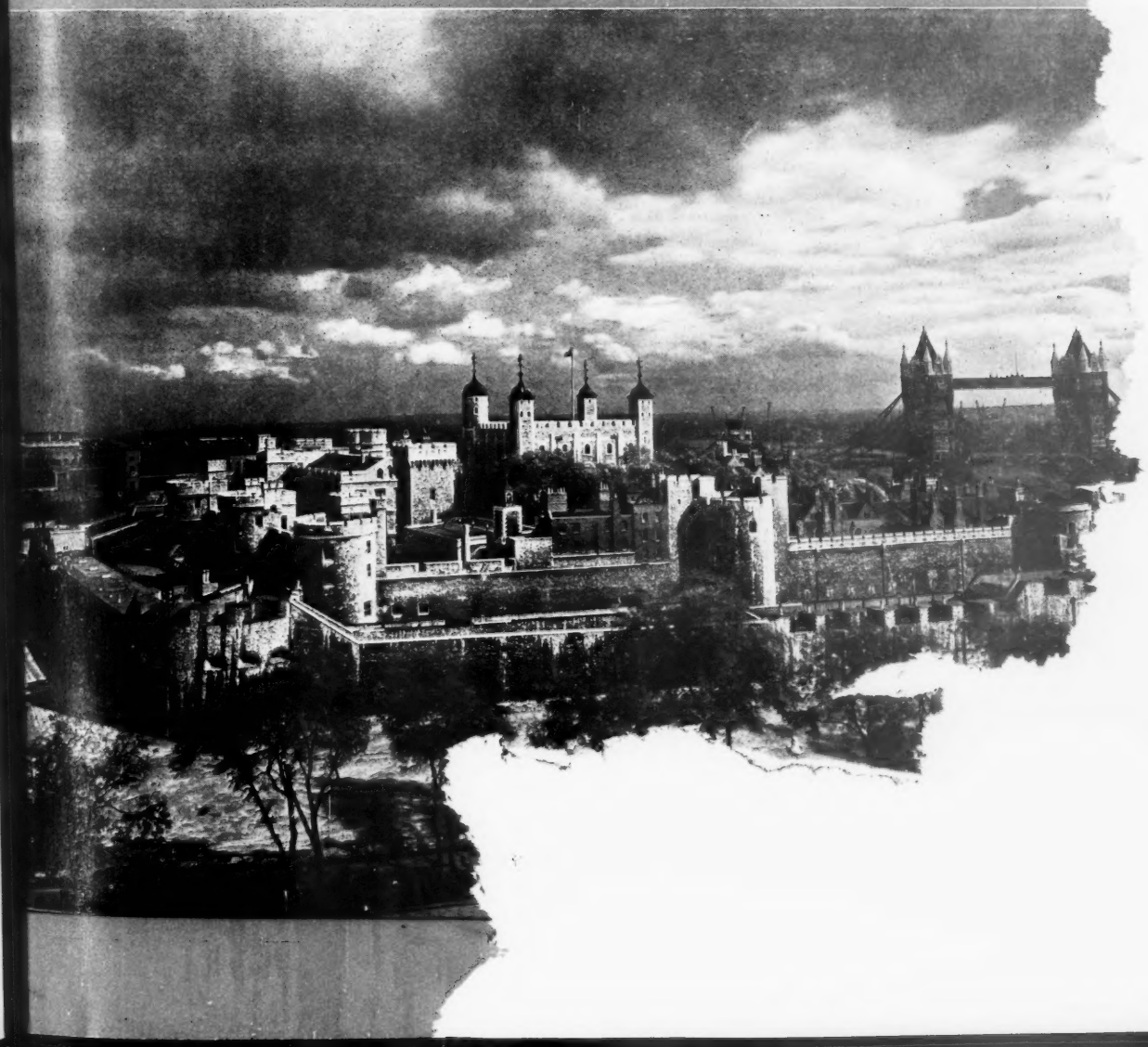

JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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Journal

R.I.B.A. Librarian

The Council announce that they have appointed Mr. Roderick Eustace Enthoven, A.A.Dipl. [*F.*] to the post of R.I.B.A. Librarian. Educated at Clifton College, where he was Scholar, Mr. Enthoven received his architectural education at the Architectural Association School of Architecture, being elected Associate R.I.B.A. in 1925 and Fellow in 1932. After serving as assistant to Mr. H. S. Goodhart-Rendel [*F.*], he was in practice with the Hon. Humphrey Pakington [*F.*] and John Grey [*F.*] until 1931, and subsequently with the former until 1945. From 1926 to 1928 he was on the teaching staff of the A.A. School.

From 1940 to 1944 Mr. Enthoven was a Civil Camouflage Officer in the Air Ministry and in 1944-45 served in Italy as Temporary Captain, General List, Monuments, Fine Arts and Archives Officer. He has been a member of the A.A. Council since 1931, serving in various offices, including that of Honorary Librarian. At present he is a Vice-President of the A.A. Since April of this year he has been acting as temporary part-time librarian at the R.I.B.A.

The Journal Cover

The re-designed cover of this number of the JOURNAL is one of the more obvious steps in the scheme of development which was described in the article "Future Journal Policy," published in the February number. Members will have noticed some minor changes and improvements, as well as a few experiments, during the last ten months. There are more to come; they will be adopted gradually after careful study and as is permitted by pressure of work in regular production. The principal improvement so far made is far less obvious than the new cover, because it is organisational.

Mr. Robert Harling, who was consulted on the design of the cover, is the editor of *Alphabet and Image* and is also responsible for the format of that and other contemporary magazines. He is also very well known as a designer of books. On Mr. Harling's recommendation it has been decided to change the photographs and the colour with each issue. This, we think, will give greater scope for editorial selection and will enable each number to be differentiated from its predecessors.

The photograph of the Tower of London is by Mr. Herbert Felton, F.R.P.S., who undertook a great deal of photography for the JOURNAL before the war, notably the photographs of the R.I.B.A. building in the Centenary number. Generally, the photographs will reflect the subject of the principal article, though this will not always be done, as in the case of the present number. It is proposed to vary the cover picture to include both modern architecture and historical architecture, the latter sometimes being taken from the very fine collection of prints in the R.I.B.A. Library.

The Library Bulletin

One of the loose inset sheets issued with this number of the JOURNAL is a returnable slip for the use of those who wish to receive from the Library the Review of Periodicals and the Library Accession Lists. The special JOURNAL Committee, which sat last year under the chairmanship of the President, recognised that only a proportion of members used these services, which have hitherto been published in the JOURNAL. While some members protested that they made a very great use of this information service, there were others who said they did not. For those who do use it, there is much to be said for having the information in a handy form, rather than having to search for a particular reference through back numbers of the JOURNAL.

The Library Bulletin will be printed quarterly and issued free only to those members who ask for it by filling in the form on the slip and returning it. The subscription to non-members is ten shillings per annum. The Bulletin is in the charge of the R.I.B.A. Librarian and all correspondence in connection with it should be addressed to him and not to the Secretary R.I.B.A., nor to the Editor of the Journal.

This new method of publishing Library information will be of much greater service to members than was the old one. They will find, in these days when new technical information simply must be studied, the Bulletin to be a very convenient method of finding the items they need. Book Reviews will continue to be published in the JOURNAL, though the Librarian, and not the Editor, will remain responsible for their production.

R.I.B.A. Staff

Mr. Frank Woodward [*A.*] has been appointed Technical Assistant Editor to the JOURNAL and Secretary of the Architectural Science Board. Mr. Woodward has had experience of both private practice and a local authority office and has done a considerable amount of architectural journalism, much of which

has been anonymous and is therefore not well known to members.

The work of the Architectural Science Board has to some extent suffered from the lack of a competent technical officer. Hitherto the Board's technical papers have had to be drafted by the honorary officers or members of the Board and its Study Groups—tasks which are added burdens to experts who are invariably fully occupied with their own specialist concerns. The Board realised that a very valuable part of their work lay in pronouncements by experts round committee tables; these tended to be lost because there was no competent technical officer to summarise them. Moreover, much of this material could well be published in the JOURNAL, to the benefit of members. Hence the appointment of Mr. Woodward. In future he will be responsible for the conduct of all A.S.B. business and will act as deputy to the Editor of the JOURNAL.

Sir Banister Fletcher's Library

The Notes from the Minutes of the Council published elsewhere in this number contain a formal statement that the Council has warmly thanked Sir Banister Fletcher for his proposal to bequeath his architectural library to the R.I.B.A. This statement may not convey a great deal to those who have not seen Sir Banister's library or who do not know its extent and value. It is indeed a magnificent collection, built up over a long lifetime by one who has always been a lover of architectural books. It will form an addition to the R.I.B.A. library of which members may well be proud.

Sir Banister has always been a strong supporter of the R.I.B.A. as an institution and has had a special interest in the library. Older members will not have forgotten that he paid for the preparation and printing of the truly monumental library catalogue, thereby giving the R.I.B.A. library a piece of machinery of the greatest value and, incidentally, arousing feelings of envy among the librarians of other institutions. We hope Sir Banister will continue to enjoy his library for many years to come, but it is good to know that some day it will be at the service of his fellow architects.

Fees in Connection with Fire Insurance Claims

A Joint Committee consisting of representatives of the Practice Committee of the Royal Institute of British Architects and the Auctioneers and Estate Agents Institute met the Fire Offices' Committee in April last, and discussed the question of fees for the *preparation* of fire insurance claims.

It was pointed out by the Joint Committee that under present conditions of insurance, fees necessarily incurred in the reinstatement of buildings can be, and usually are, included under the insurance, but that the Fees Clause specifically excludes fees for *preparing* any claim or estimate of loss. The insurance of fees is, therefore, limited in its scope, in so far that architects' fees for the reinstatement of loss or damage to buildings can be insured, but surveyors' fees necessarily incurred in the *preparation* of the priced schedule of quantities, usually required by the insurance company in support of the claim, cannot be insured, and no claim for the repayment of such fees is allowed under the conditions in the policy.

The Joint Committee requested the Fire Offices' Committee to recommend the alteration of the wording of the Architects' Fees Clause, normally used by the Fire Office, to include surveyors' fees incurred in the *preparation* of a claim to read thus :—

> "FEES CLAUSE.—It is hereby declared that the sums insured on buildings are understood to include Architects', Surveyors' legal and other Fees for estimates, plans, specifications, quantities, tenders and supervision necessarily incurred in the preparation of any claim and in the reinstatement following destruction of or damage to the buildings by any peril hereby insured against at a percentage in accordance with the scale of the Royal Institute of British Architects, the Royal Institution of Chartered Surveyors and the Law Society in force at the time of any loss."

It was furthermore suggested that this clause should be a standard condition printed on all policies of fire insurance, including "Comprehensive Policies," it not being considered desirable that the Fees Clause should only be attached upon request of the insured. The above recommendations were warmly supported by the Corporation of Insurance Agents, who were of the opinion that the fees should apply also to the insurance of chattels, as well as to buildings.

The Fire Offices' Committee have intimated that, after careful consideration, they regret that any demand for payment of fees for *preparing* fire claims cannot be entertained, and they state that the offices do not favour the adoption of a standard clause regarding architects' fees for inclusion in policies generally.

It will be observed that as a result of the approach to the Fire Offices' Committee the "Architects' Fees" clause remains unchanged. It will thus be necessary for the insured to continue to make individual arrangements in the matter of the insurance of fees when entering into contracts of insurance.

"Fuel and the Future" Conference

The Institute has been thanked by the Minister of Fuel and Power for its co-operation in organising the architectural section of the Fuel and Power Conference held in London from 8-10 October. The value of the conference, the immense interest aroused by experts' papers on the most recent research on heating problems, the accommodation provided for display of exhibits and the success of the conference as a whole are attributed by the Minister in large measure to the part the Institute played.

The proceedings of the opening session, and Sessions I and II of Section are reported on pages 3 to 30 of this JOURNAL. The remainder of the Conference will be published in the December R.I.B.A. JOURNAL. The whole of the proceedings are to be reprinted in pamphlet form for easy reference. Copies are obtainable from the Secretary R.I.B.A., price 2s. 6d. post free.

Christmas Holiday Lectures

For the first time since the war the R.I.B.A. is once again arranging to hold its special lectures for boys and girls during the Christmas holidays. They will take place at 3 p.m. on Monday, 30 December 1946, on Wednesday, 1 January, and on Friday, 3 January 1947. Mr. G. A. Jellicoe [*F.*] is to be the speaker: remembering the previous talks he has given we feel certain that the boys and girls who attend will be both instructed and entertained. The subject of the talks is: *Architecture: What It Means: How it affects you at Home, at School and at Play.* In due course schools will be notified concerning the talks, but in the meantime members may like to make them known among their young acquaintances. Tickets will be available later, free of charge, from the Secretary, R.I.B.A.

National Scale of Salaries

Judging by the increasing number of enquiries that the Institute is receiving on the subject, members in the service of local government will be interested to know that for some time past a sub-committee of the R.I.B.A. Joint Negotiating Committee have been examining the application to architects of the National Joint Council Scales of Annual Salaries (Administrative, Professional and Technical Division). The work of the sub-committee is now complete, and—subject to the approval of the R.I.B.A. Council—a memorandum embodying recommendations for the improvement of the National Scales will be submitted to the National Joint Council. Members will appreciate that until those recommendations have been made known to the two Councils, it would be inadvisable to publish them.

R.I.B.A. Diary

Wed., 4 Dec. 6 p.m. A.S.B. Lecture. *Health and Welfare in Factories.* H. G. Maule, Factory Inspectorate Staff.

Tuesday, 10 Dec. 6 p.m. General Meeting. *Heavenly Mansions. An Interpretation of Gothic.* John Summerson, F.S.A. [*A.*], Curator, Sir John Soane's Museum.

Monday, 30 Dec. / Wednesday, 1 Jan. / Friday, 3 Jan. 3 p.m. Christmas Holiday Lectures at R.I.B.A. for Boys and Girls. *Architecture—What it means. How it affects you at home, at school, at play.* G. A. Jellicoe [*F.*].

Wednesday, 1 Jan. 6 p.m. A.S.B. Lecture. *House Foundations.* W. H. Ward.

MODERN HEATING AND THE ARCHITECT

REPORT OF THE ARCHITECTS' SECTION OF THE CONFERENCE "FUEL AND THE FUTURE"

Held at the R.I.B.A. and Westminster Central Hall, 8, 9, 10 October, 1946.

The Opening General Session of the Ministry of Fuel and Power Conference, "Fuel and the Future," was held at the Central Hall Westminster, under the chairmanship of Dr. E. S. Grummell, C.B.E., Chairman, Fuel Efficiency Committee. It was attended by members of all the eight sections of the Conference, of which the Architects' Section, Section G, "Modern Heating and the Architect", was one. The General Chairman of Section G was Mr. M. Hartland Thomas, M.A. [F.], Chairman R.I.B.A. Architectural Science Board and it took place in the Henry Jarvis Hall. The President, Mr. L. H. Keay, O.B.E., presided at the opening session on Tuesday, 8 October.

OPENING GENERAL SESSION (CENTRAL HALL, WESTMINSTER).

The Rt. Hon. E. Shinwell, M.P., Minister of Fuel and Power, opened the Conference by stating that no subject was so far-reaching or so beneficial in its ultimate consequences as that which promoted the efficient use of fuel. The subject, although directly associated with the present fuel shortage, was more than a short-term problem; it concerned the country's industrial, and therefore its social future. He said that unless we could promote the highest efficiency in the use of our fuel resources and make the necessary changes in the technique of industry, we should be unable in the coming years to maintain our prestige in the industrial field and would be unable to provide a high standard of living.

The Minister said we were at the beginning of another industrial revolution with far greater opportunities than those that faced the people 150 years ago. If, however, the opportunities were greater, so was the need. Modern standards of living must not any longer misuse our resources, rather should we exercise our ingenuity and skill in removing all forms of waste—using our raw materials and reduced man-power in the most effective fashion. The purpose of the Conference was a search for higher efficiency in fuel utilisation.

After speaking of immediate problems and the efforts being made to stimulate recruitment, opencast mining and mechanisation the Minister said that it had been necessary to arrange for the use of imported oil to meet in some degree the present shortage of coal. There were limits, however, to the relief to be found from importing and using oil. The limits of the present conversion programme had been reached and all industrialists should seek to bring their coal-burning equipment to the peak of efficiency.

Turning from the short-term prospects to the long-term, and from the period of improvisation to that of planning, the Minister doubted whether, as a long-term policy, fuel efficiency required either explanation or justification. Until 1914, the availability of good quality coal at low prices in the United Kingdom had resulted in little attention being paid to its efficient use. Since the 1914-18 war the population had steadily increased. This factor, a higher standard of living and a corresponding all-round efficiency resultant upon progress in fuel technology and research, had developed ahead of the necessary increase of coal output. For instance, in 1920 coal consumption per unit of electricity generated was 3.74 lbs. By 1929 this had decreased to 1.5 lbs. per unit and by 1937-38 only 1.43 lbs. per unit was required. Statistics and careful research had shown that at the moment, although production was rising, consumption was outstripping it by far. Moreover, the Programme of the Conference showed that new demands were already appearing. A potent example was agriculture as a fuel-consumer in recent years and domestic heat and power needs were going to rise very rapidly. The Fuel and Power Advisory Council had described the British home, in cold weather, as "the smallest in the civilised world." All the functions of family life were confined, claimed the Council, "to a narrow half-circle of warmth in front of the sitting-room fire." Were we, asked the Minister, to remain content with this state of affairs? Modern developments would leave no room for absenteeism among fuel technologists and others concerned with efficient use of fuel. He assured specialists they would have the full support of his Ministry, not merely as a statutory duty but as a matter of firm conviction. They would need other than Ministerial support alone. In industry the support of management and labour must be enlisted. On the domestic side, the technician must carry with him architects, housing authorities and the ultimate consumers, housewives.

The Minister concluded his address by wishing the Conference every success in its vigour, its capacity for direction and, above all, in a realisation that much depended "on its courage in departing from the bad old ways."

Alderman Charles Key, Parliamentary Secretary to the Ministry of Health, spoke on behalf of the Minister of Health, the Rt. Hon. Aneurin Bevan, M.P., who was unable to attend the Conference. Alderman Key said he wished to concentrate his address upon the fuel services that were necessary to the completed home, to keep it warm, and to provide hot water and cooking facilities. In 1938 British domestic consumption of coal amounted to over one-third of the total consumption, but in spite of the enormous amount of coal consumed on domestic heating the resultant heating services had in many ways been very inadequate. He supposed most houses had reasonably adequate cooking facilities, but space heating and water heating arrangements, particularly in low-cost houses, had left much to be desired, not only as regards the efficient and economical use of fuel but also as regards the comfort and health of the householder.

Alderman Key said that already the rate of house-building

was gathering speed. Families were being rehoused at the rate of 1,000 per week, a large proportion of them in new houses, permanent or temporary, and in the next few years we should see new houses going up faster than ever before.

Turning to domestic fuel consumption, as he saw it, there were three fields, different, though closely linked, for the improvement in domestic fuel services; the appliance, the house and the estate. Regarding the first, he thought it was generally accepted that as far as gas and electrical appliances were concerned the position was fairly satisfactory. There was always room for improvement but much was achieved during the inter-war years to put reasonably efficient appliances on the market and within the reach of the lower income groups but the story with regard to solid fuel appliances was a very different one on which, in his view, there was urgent need to concentrate. His Ministry would do all in its power to urge local authorities to instal such improved appliances as had been fully tested and approved by the Government. It was well known that many improved appliances whose initial cost was high, paid for themselves many times over by the resulting economy in fuel. He wanted to make it quite clear that much as the Government was concerned to get housing costs down, local authorities' plans would not be mulcted of improved appliances merely on account of additional cost. The chief difficulty about improved solid fuel appliances was that of quick production. It had therefore been necessary for production of pre-war models to be continued for a time, but as production capacity increased it would doubtless be possible to complete the change-over without slowing up housing progress and he hoped manufacturers would co-operate in this object.

Discussing the design of the house and its relation to fuel efficiency and economy, this was a matter which concerned the architect. The Ministry of Health had already asked local authorities to pay more attention to methods of thermal insulation in design and had already recommended that increased provision should be made to meet fuel shortage.

District heating was a subject on the domestic side of which we in this country had much to learn and the Government was anxious to encourage the making of experiments to increase our knowledge. If we could get efficient district heating schemes at reasonable cost to the tenant we should have made a great step forward in the domestic heating field.

To sum up, the Ministry of Health wholeheartedly welcomed the new interest in domestic heating—largely a necessity though it might be—now growing up in this country, and Alderman Key said the Minister of Health was gratified that the Conference afforded an opportunity to discuss these matters in detail.

OPENING SESSION OF THE ARCHITECTS' SECTION AT THE R.I.B.A.

SESSION I. THE PRESIDENT, Mr. L. H. KEAY, O.B.E., IN THE CHAIR

The President said it had been his privilege that morning to be present at the Central Hall, Westminster, and to see the enormous gathering of enthusiastic persons interested in the very important subject of Fuel and the Future. In the name of the Royal Institute of British Architects he welcomed the members of the Conference to the present meeting of the section which dealt with the subject of Modern Heating and the Architect. He did not think that a meeting on that subject could be held in a better place than a lecture hall of the R.I.B.A., in view of the close collaboration that was necessary between those who planned buildings and those who designed the equipment for them. He wished to stress the importance of that co-operation. Personally he would not mind losing a small amount of efficiency to ensure that a building was properly planned and planned primarily for the comfort of those who occupied it and that its equipment did not contend against the notions of those who desired everything within the building to be properly designed.

He himself was one of those people who preferred to receive their heat by means of a wire, but he thought that the open coal fire would die a very hard death in this country, especially amongst those members of the population who worked in the open air. That might be a very unpopular thing to say at a meeting such as the present one, but he would prefer to be jeered at for telling the truth than to be applauded for hiding it.

It had been said at the meeting that morning that over one-third of the coal used in this country was used for domestic purposes. If that was so, he estimated that at least one-quarter of the coal used in this country was used in buildings which were at the present time inadequately heated and in which the apparatus for the other purposes for which the coal was used was not highly efficient. If that was the case, surely the problem to-day was first of all to see how the limited supplies of coal could be used in the most efficient and effective manner. As one who had had some experience in small housing, he wished to issue a warning that the limit of cost for housing in this country had been reached and that the people who occupied the small houses in this country could not afford to spend any larger proportion of their weekly wages on light, heat and power. He knew it was often argued that if more money was spent on the equipment the subsequent running and maintenance costs could be reduced, but that did not appeal very strongly to a person going into a house or to the person providing it. Personally he believed that the running and maintenance costs could be reduced and he hoped that, as a result of the Conference, those who were in a position to do so would apply their minds to the planning of more efficient equipment which would be run and maintained at a very much lower cost.

THE FUEL POSITION AND PROSPECTS.

Mr. Hugh Gaitskell, M.P., Parliamentary Secretary to the Ministry of Fuel and Power, speaking on the "Fuel Position and Prospects," said that he was specially pleased to address an audience of architects. He thought they were extremely important people and he believed that the development of culture in this country was closely bound up with the design and form of buildings. The fascination of architecture was not only in the provision of æsthetic forms but it was a combination of technical problems with æsthetic forms.

His task was to provide a background for discussions in that the designers would wish to hear from him what were the prospects with regard to the various types of fuel available. They would want to know before deciding on how to plan heating in the modern house, what sort of fuel would be available.

He would begin with the very simple proposition that heating was provided by coal fires, by gas, by electricity or by oil. If provided by gas and electricity it came from coal, except for the tiny fraction of power generated by water. Therefore, as the proportion of oil heating was very small indeed, it was evident that coal was the basis of the whole matter and he need make no apology for beginning with some examination of the coal situation.

Since 1938 the output of coal in this country had fallen by about 25 per cent. This was due partly to a reduction in man power of some 10 per cent., partly to reduction in output per man shift and, to a very small extent, to a very small reduction in the number of shifts worked per man per hour. The decline in output per man shift, which began even before the war, followed very much the same course during and after the war of 1914-1918. It had not been until 1927 that the output per man shift reached the 1913 figure again. He mentioned this because he thought this development was probably not unconnected with war and

had its roots fairly deep in the changes created by war conditions. During this war the output per man shift had not fallen so far as it did during the first world war and was already beginning to recover. There had, however, been a big fall in output which was almost entirely met by reduction in exports and to a small extent by an increase produced by open-cast mining. The consumption of coal last year for inland purposes had been about the same as in 1939, but this year it was rather more.

As regards the consumption position, the coal consumed directly for domestic purposes had fallen since 1938 by no less than one-third. The reduction may have been forced upon consumers but there appeared to be already beginning some change in people's habits in this connection. With regard to electricity, the opposite was the case, the amount of coal used for generating having increased by 50 per cent. since 1939. There had been a similar increase in the amount of coal used for gas production but a considerably larger increase—about twenty per cent.—in gas consumption due to the more efficient manufacture of gas. There had been an increase in the use of anthracite and coke for domestic purposes but both increases were relatively small, the amounts of such fuel used being still tiny.

As regards the future, it was necessary to make a sharp distinction between the long and short periods. The short period was naturally present in our minds but architects were surely much more concerned with the long-term aspect. Even a prefabricated house had a fairly long life, whilst we could assume that a permanent house would last at least 60 years. Therefore he proposed to discuss the long-term fuel prospect.

Mr. Gaitskell went on to say : " I suppose you really want to ask me a series of questions such as the following : We have heard a great deal about fuel efficiency and we know that much has been done in recent years to improve that efficiency, owing to the shortage of coal, but should we have in mind a continuing need for fuel efficiency over a long period ? We are building houses to last for sixty years. Have we to think of the need for fuel efficiency continuing for anything like that period of time ? Are we to expect a continuing coal shortage for so many years ? Ought we to plan for all-electric or all-gas rather than for direct coal consumption ? The President has referred to what he thinks people feel about the open coal fire, and I agree with him. I think there is a great deal in what he says, but at least there is the possibility that one might say : ' Well, we really must consider some alternative.'

" The first observation that I wish to make on the group of questions which I have mentioned is that when we speak of fuel efficiency we are apt to confuse two rather different meanings of the term. We may mean getting a better result in the sense of more heat from a particular quantity of coal without any additional expense, or we may mean getting a better result at a certain cost ; it may be at any cost, but, at any rate, cost entering into the matter. With regard to the first, I have nothing to say. It is clearly a matter of great technical importance, and no doubt other speakers will deal with it. If you can find ways and means of providing more heat from the same quantity of basic material without any extra cost, nobody is likely to argue about the matter, and anyone who can do that will clearly be a benefactor. I suppose, however, that although there may be developments in that direction we should be fortunate if we found that the scientists could from time to time suggest ways of providing more heat which involved extra cost, and it is that case—the case in which greater efficiency can be obtained but at an additional cost—which I think we ought to consider."

Mr. Gaitskell went on to say that the scarcity of coal at the moment was partly the reflection of the fact that it was an article whose distribution and price were fairly carefully controlled. No one would question the desirability of that but if there were no control there would be the alternative of very much higher prices. To the ordinary person, then, the scarcity would not be of coal in the direct sense, but of money with which to buy it ; when we were thinking in terms of ten and forty years the question was not whether coal was going to continue to be scarce but whether the price of coal was likely to be higher in relation to other costs. That, he thought, was the real issue that architects would have to consider and which would determine how much incentive there would be to economise.

Under the scale of values of different commodities the price of coal had certainly gone up substantially since before the war. Reference had been made to an increase of 120 per cent. which was certainly above the general level of prices. He thought he could say that the price of coal before the war was artificially low ; it was low only because the wages of miners were low and the wages of miners remained low only because there were not sufficient alternative jobs for the miners. As soon as there was a state of full employment the wages went up and he thought that this would have happened even if there had not been a war. Since labour costs were about 70 per cent. of the production cost of coal there was bound to be a reaction on prices.

He thought we could expect to see in the industry in the course of the next five years or ten years, very remarkably substantial technical changes and he saw no reason to doubt that these changes would increase to a considerable extent the productivity of the mines. That in itself did not indicate that coal was likely to become cheaper again but he had heard some technicians in the industry speaking of reducing the pit-head price of coal by these economies, by about 10s. per ton. They had to balance against that the question whether the price that we paid to get people to go down the pits now was an adequate one in the sense of being sufficient to induce people to do so. The matter was a complicated one but he would go so far as to say, with great caution, that it would be rash to assume, in the present state of recruitment to the industry, that the wage differentiation as between coal mining and other occupations had necessarily reached equilibrium. He would emphasise that this was only his personal opinion and that it was not in relation to other things. He was not talking about the absolute level of prices, which depended on the value of money, but of the relative level.

This should not be taken to mean that gas and electricity were to be preferred to coal. Although gas and electricity were both derived from coal, the coal was subjected to a number of subsequent processes and an analysis of the cost of production of a unit of electricity or cubic foot of gas, showed that the element of coal cost was small. Therefore a rise in the price of coal did not favour the use of something produced from coal rather than the use of coal itself. We could not, however, conclude from this that there should be a compulsory switching over from gas to electricity in the home. The reasons for that were very fully set out in what was generally known as the Simon Report, the Report of the Advisory Council on Domestic Fuel Policy. The report pointed out that any attempt to do this would involve an enormous expansion in the load which had to be carried and could only be done at the cost of building a vastly greater number of generating stations. He thought that the arguments of the Report were quite conclusive and that the capital costs would be such as to make it clear that the winter load would continue and must continue to be met by solid fuel.

On the subject of atomic energy Mr. Gaitskell said : " In the statement I have made I take no account of any developments which may be possible in the application of atomic energy. Frankly, I do not know sufficient about that. I do not know whether the economic arguments which make it difficult to contemplate providing electricity generated by coal for carrying all the burden of heating would apply if the electricity were generated by atomic energy. There may be people here who can express opinions on that subject, and, if so, it would be very interesting to hear them. Subject to that qualification, I think the statement in the Simon Report on this subject is unanswerable."

Mr. Gaitskell continued :

" Reference is made in the Simon Report to the advantages of smokeless fuel, and it is pointed out that it is a convenient coin-

cidence that the type of fuel which will provide more efficient supplies of heat for the consumer will also do away with the pollution of the atmosphere by smoke. I think we should regard that as a matter of considerable importance. Here we have an example of something which costs the community a great deal in pollution which the individual who burns the coal does not suffer. When a man burns coal, whether it be in a factory boiler (unless it is very well manipulated) or in an ordinary domestic grate, he is in fact dirtying a lot of linen for other people all over the country. Of course, we may be doing it for one another, but some of us do not do it. This is a heavy social cost and it must be, in my view, taken into account in our planning. Therefore I do not think there is the slightest doubt that the arguments in favour of smokeless fuel are very strong indeed. We are confronted, however, with the following difficulty. If you are planning for twenty, thirty or forty years ahead, I should think there would be a fair prospect of supplies being available, but you cannot assume that there will be any rapid expansion in this field. Consider the figures for a moment. A 10 per cent. decrease in the consumption of coal directly would require an increase of 140 per cent. in the production of anthracite to meet it. That gives you a measure of the difficulty of switching over to anthracite, and if you ask: 'What about coke?' I would say that obviously the supply of coke for domestic purposes is primarily dependent on the production of gas. A steady expansion of the demand for gas is expected, but not on the scale that would make it possible for us to contemplate any general switching over to smokeless fuel in a few years. Therefore, my conclusion, as it happens (and it is another happy coincidence), is substantially the same as that of your President. By all means let us do what we can to encourage the use of smokeless fuel, which has, as I have said, a great advantage as compared with the burning of coal in the old way, which costs us a great deal in the way of pollution of the atmosphere, but for the time being please do not design your houses on the assumption that it will be unnecessary to burn coal. We must have appliances at the moment which are capable of burning smokeless fuel, but they must also be capable of burning ordinary bituminous coal. That carries with it one other point of importance to architects, namely, that chimneys will still have to be swept, therefore they must still be get-at-able."

Mr. Gaitskell said he would have liked to give a programme of wonderful new developments in the supplies of fuel which would have clinched the matter as far as house designing was concerned; such an action would have been romantic but quite inaccurate. The position was that there was a tendency for the price of coal in relation to other commodities to continue at a fairly high level. There was a tendency, therefore, for people to use what might be called the more developed forms of coal rather than coal in the raw state. That could not be carried to the extent of using gas and electricity exclusively. Furthermore, although we could expect a gradual transition to smokeless fuel we could not expect that to take place quickly. Therefore, both houses and appliances should be multi-purpose in character and should allow for burning, not merely all the finer grades of smokeless fuel, but even the old solid bituminous coal.

DOMESTIC HEATING REQUIREMENTS

THE BASIC NEEDS

Professor Sir Alfred Egerton, F.R.S., Chairman of the Heating and Ventilation (Reconstruction) Committee of the Building Research Board, said: I should like to divide my remarks under three headings; first, the need for efficiency in the use of fuel; secondly, the need for the architect's help; and, thirdly, the need for looking ahead.

The holding of this Conference is a real sign that in this country we have awakened to the fact that our methods of using fuel for purposes of the home have in the past been grossly inefficient. Since domestic heating forms the largest single use of coal, unless we do something to get all we can out of coal for this purpose our general national economy will always be under a serious drag. It is surely hard enough to get the coal. Why throw it away?

As you know, before the war we used about 60,000,000 tons of coal per year for household purposes, including what was used for the purposes of supplying electricity, coke and gas. Mr. Gaitskell told us that the figure for the year before the war was 44,000,000 tons, and I was very glad to hear that only 30,000,000 tons were used last year. That shows that there is some saving being made. The 60,000,000 tons of coal were about one-third of the total coal used for all the country's activities and about one-third more per head than is used in continental countries where the winters are far more severe than they are in this country. Furthermore, the heat was provided in such a way that our houses were far less well heated.

On the Committee of which I had the honour to be chairman I was helped by many people of great experience, amongst them being your President and members of the Fuel Research Station and the Building Research Station. The Committee studied the subject of domestic heating from three aspects, one leading to another. First, we needed to arrive at some indication of the average requirement for comfort in the home; for instance, what sort of temperature is necessary in the various parts of the house, how much ventilation, how much hot water and at what temperature. All those things needed close study from many different aspects, including the medical aspect. I say "average" because some people's idea of a comfortable temperature is very different from that of others, and it is necessary to try to measure the average requirement. We attempted to set out the standards, and I am glad to say that they have been generally accepted as a basis on which to work. I must refer you to the Report, which probably most of you have seen, for the various details. It has been accepted as the basis for the work of the Simon Committee and for obtaining some measure of agreement on the question of domestic fuel policy. That study led to the working out of the heat requirements for an average house or flat for a family of four in order to provide these desirable conditions. That involved the study of the effects of insulation in conserving the heat, and I am very glad to find that a whole meeting of this Conference is being devoted to the question of insulation. It also involved studying the effect of internal wall coatings to shorten heating-up periods in rooms, and, to conduce to general comfort, the need to lag pipes and tanks to conserve the heat put into hot water. The total amount of heat needed to meet the standard requirements worked out at between 350 and 530 therms per house per annum, of which about 180 therms would be for water heating. The needs of hot water in the house were set out in the Heating Report. The questions of the number of baths, how much water was required for washing, and so forth, were gone into, and an average figure of about 250 gallons per week was arrived at. That study led in turn to a consideration of the means of providing the heat requirement in relation to economy and all the other factors—smoke abatement, labour saving, adaptability and convenience—which enter into the choice of means of providing the heat.

Although the Committee's work went only some of the way to point out the improvements possible, we must feel gratified that we are launching out with a new outlook on the whole problem, and this Conference is a real sign that we are now convinced of the need to tackle it with all the characteristic energy and good sense that this country possesses.

The problem of heating is a dual one. On the one hand, we need to improve the standard of heating. We need to make use of the whole house, which must be warm enough everywhere for its purpose and not chilly and cavernous in the bedrooms. If one member of the family wishes to do his or her homework in a room upstairs, that room should be capable of being warm

enough to prevent him or her getting chilly and perhaps developing a cold. Chilliness has a very serious economic disadvantage.

It has been pointed out in several reports that our houses are larger in area than houses in other countries for the same income groups, yet the area properly warmed is smaller than in any other civilised country. The principle of background heating helps to overcome this difficulty. Many people do not like the home to be uniformly heated throughout, and in this climate, which is very variable, that is understandable. It is better to maintain the whole house off the chill, so that damp can never condense, and then to bring it up to temperature where and when required. This is the principle of background heating with topping up as desired. It is a system which allows flexibility, choice of ways and means, and it is generally accepted as a fairly wise way to start to improve our standards of heating as well as allowing perhaps for more economy than the system of full heating might allow.

Improved standards of heating mean more fuel spent, unless the efficiency of methods can be improved. Therefore not only have we to improve efficiency to reduce the total quantity of fuel needed for domestic purposes, but we must improve it still more because we also need to improve the standards of heating. We cannot do with less than an all-round doubling of the average efficiency of the use of fuel for domestic purposes. If before the war the average efficiency was about 20 per cent., it must in the future become at least an all-round 40 per cent. Instead of one-fifth of the coal being utilised, two-fifths of it must now be used. If we are to achieve national economy as well as new standards of heating, instead of putting 1,500 therms into a house, as we on the average were accustomed to doing before the war, and using only 300 of those 1,500 therms, we must now put in less than 1,200 therms and use at least 500 to 600 of those therms. Can this be done? It cannot be done without your help. In new housing it should be quite possible, but new housing will be only a part of the total housing; there will still be a greater number of existing houses fitted with old wasteful appliances. If, with rising standards of heating, these methods are still used, we shall not get the general reduction in the use of coal for domestic purposes which is necessary for the nation's welfare, so I urge all those who can help to see that new methods are introduced to renovate the heating arrangements and improve the insulation of old as well as new housing. This is just as important as ensuring that all new housing is built with satisfactory thermal insulation and fitted with efficient and convenient new appliances.

In new plans it is essential that the house and its heating services should be considered as a unit. The first cost may be high, but, in view of the savings in fuel and maintenance over a period of years, the overall cost should be considerably lower than that for a less well-planned house. I do not intend to try to tell you how to build the house—you know that much better than I do—but I do hope that, as a result of our Report on the house and its heating services, all the new houses will be designed as a whole unit. Their whole structure should be considered from the point of view of how they will behave thermally. In our Report the necessary approximate calculations are indicated, so that the behaviour of the houses can be estimated beforehand in relation to the climate and the properties of walls, windows, floors, ceilings and so on. Make sure by calculation that the house will need less than a gross 1,200 therms and that half is usefully employed.

I am sure that in the design of houses for rural and urban districts much thought has been given by builders and architects, gas and electrical engineers and solid fuel appliance makers to ensure, first, that the houses will be insulated so that heat is conserved. Both our Report and the Reports of the Ministry of Fuel show what amount of insulation is worth while. Our ancestors were sensible in that they built their houses with thick walls and then panelled the insides or hung tapestries. With modern capabilities and materials, we can get the same results with less difficulty and at a fairly low cost. Secondly, the house should not be littered with appliances. As few as possible should be used to supply heating and hot water requirements. Each appliance has its own wastage; therefore as small a number as possible should be used. By clever design and positioning you architects are able not only to reduce the labour needed in attention to appliances and to increase amenities but also to eliminate expensive chimneys.

It can be left to the experts, women particularly, to discuss just how they can best get those numerous amenities that are needed in the home—the good supply from a 35-gallon or a 40-gallon tank of 250 gallons of hot water per week at 140 deg. F., the laundry and drying facilities, the warm cupboard for airing or keeping clothes nice and warm before going out (a subject on which Rumford, our first heating expert, expatiated 150 years ago), efficient cooking stoves and well shaped pots and pans. The particular industries—gas, electric and solid fuel—will say what they can do. Let us have collaboration and let us have combination of utilities where such combination can help. In this country we must lead in the design of appliances and methods of heating, so that, instead of being considered the most backward of countries in regard to heating, we shall surpass what others can do and export our heat services and methods to the peoples abroad.

The problem of heating a house is to convey heat from an appliance in which the fuel is burned at high efficiency, either in or outside the house, and to convey it to the places in the house where it is wanted. That can be done by the use of air or hot water as the medium. We are still backward in the design of convenient, low-cost central heating equipment, and more attention should be given to this. It is one particular point that I wish to stress. It should be possible to design appliances which will burn raw coal and have a high efficiency.

At present much of the heating of industrial and community buildings is effected by numerous separate central heating plants heating individual buildings. The efficiency is probably not far from 50 per cent., which is quite fair. The average consumption of heat per head of population is probably about 40 per cent. for these community and industrial buildings and 60 per cent. for housing, but these figures vary quite considerably from town to town. Much could be done towards achieving efficiency of heating if all types of building could be served from larger grouped central sources of high efficiency. Modern boiler plant can be easily operated at 70 to 80 per cent. efficiency, and the loss in distribution over short distances should not be more than 10 to 15 per cent., so that by grouping there is a certain gain in total efficiency as well as a considerable saving of labour.

If there is to be a move towards heating from central sources, it is of considerable importance, as I have already said, that attention should be paid to appliances—radiators, calorifiers, etc.—which can be fitted in houses, particularly as there are great possibilities in still larger schemes. Our Committee has been considering the subject of district heating, a term which I think should be reserved for areas of at least 5,000 inhabitants. Our Working Group, under the chairmanship of Mr. Stubbs, has now produced a very formidable report which has not yet been issued. The Working Group went into the subject very thoroughly. It took a hypothetical town of 250,000 inhabitants, with heat distributed as hot water from a station generating heat and electricity together. Such a station would have an overall thermal efficiency of 70 per cent., instead of the 25 per cent. of existing straight electrical generating stations. The increase in efficiency over separate straight electrical generation and straight hot water distribution from a central boiler plant providing the same electrical and heat output would be raised from 52 per cent. to 70 per cent. The adoption of a scheme such as has been studied would reduce the fuel consumption of the population served by 48 per cent. and at the same time would give 32 per cent. more heat than is at present obtained from the 277,000 tons of solid fuel which would be consumed by present methods for a population of 250,000. The capital cost is great—about £45 per head—but the over-all cost to the consumer is encouraging.

That is the case for district heating. There are many con-

siderations which come into the question, and by way of caution our Committee has set down in an Interim Report, available to the Conference, the various considerations which enter into the subject and which make it somewhat difficult to implement. I hope, however, that this Conference will urge that some district heating scheme, on a large enough scale, should be started in some place, with a view to its extension at a later date, in order that experience may be gained in this country of this method of heat supply, which does provide a great opportunity for fuel saving.

We are behindhand in methods of really large-scale heating. In Russia and the United States schemes have been operating for many years, and our great urban districts are surely very suitable for such development, particularly in these times of reconstruction. Looking ahead still further, with rising prices of coal and possibilities of utilising nuclear energy we shall need to have a large-scale system of distributing heat. Why not make preparations for such developments now? This reconstruction period is surely the time to make a start. What I have tried to suggest is that, although we may not be able to introduce the most desirable methods of full heating at once, we should have them always in mind and in our designs ensure that our houses can be adapted to new methods. That is why I should like to see small individual central heating devices developed which can be adapted to group heating from grouped central sources or later even from district heating schemes. There are other technical developments which have come on the scene—the gas turbine in its relation to power plant and the heat pump as an adjunct for special heating purposes—helping perhaps to balance the loads between heat and power. These are interesting days, in which great improvements can be made in clearing away past débris and launching out on well considered plans which will help in setting this country in a good sound economic position, with its basic needs efficiently satisfied.

DOMESTIC FUEL POLICY

Sir Reginald E. Stradling, C.B., M.C., D.Sc., F.R.S. [*Hon. A.*], Chief Scientific Adviser, Ministry of Works, said: Sir Alfred Egerton has said a good deal of what I intended to say, so I will only touch upon the points which specifically affect the Simon Report. It is very unfortunate that Sir Ernest Simon is not able to be here himself to discuss the implications of his Report to the architect, but, as you probably know, he is addressing another section of the Conference. I was merely an Assessor on the Committee, and two things impressed me very much indeed. One was the vast amount of work which Sir Ernest put into the work of the Committee himself, and the other was the great efforts that were made by the individual members of the Committee to make the Report as useful and effective as possible. I wish to emphasise that, because some of the recommendations which we are putting before this Conference are rather upsetting to traditional practice. A vast amount of very close study by some of the finest brains in this country was utilised in producing the Reports of the Committees presided over respectively by Sir Ernest Simon and Sir Alfred Egerton, both of whom must, I think, have had very serious difficulties in bringing together and ultimately obtaining practically unanimous recommendations. Whenever a Committee meets to discuss problems affecting intimately the life of the community, the clash of vested interests is inevitable, and in "vested interests" I include those of the specialist technician or scientist, who finds it just as difficult to accept the fact that his personal angle of approach to the subject is not the full truth as do those sections of industry equally involved. I am quite certain that one of the problems we have in front of our Conference here is a similar difficulty. The acceptance of the recommendations of the Report on Domestic Fuel Policy does involve a coming together of all interested in construction and a frank facing of the fact that we have to change our methods, in particular our method of approach to the design of a building. This is honestly difficult in a human activity at any time, but it is particularly so in one which for many generations has been almost entirely dependent upon expert craftsmanship.

The impact of modern conditions both in its changing demands upon buildings and in the provision of new types of facilities for building, uncatered for in the traditional development of the industry, has brought about considerable confusion and irritation. Recently cries have even been heard which reflect this in the extreme form of an appeal to slow up research because certain portions of the industry cannot keep pace. Such an appeal seems to me a counsel of despair, for the true requirement is a speeding up of the collection of information and an intensive drive to get this knowledge incorporated in practice.

As I see it, the problem before this Conference is just the one that I have outlined, and I will summarise it as follows. We have a new requirement, peculiar to present-day conditions. It is being demanded by the nation from the building industry. Whereas in the past we had a cheap and plentiful fuel supply, at any rate for certain sections of the community, the nation now demands that the heat supplies shall be greatly improved for all, and this at a time when fuel supplies are more difficult than ever before. That is the first point. Secondly, two important Committees have been at work bringing together a statement of the requirements and also to a large extent the basic data on which the supplying of the demands must be built, and, thirdly, further information is available, based on other investigations, and efforts are being made by the Government to create the supply conditions essential if the industry is to do the job required.

I should like now to deal with one or two of these points. I do not want to say anything about Sir Alfred Egerton's Report, except that the basic standards of heat requirements laid down by Sir Alfred's Committee were adopted by Sir Ernest Simon's Committee. In that way the two Reports are linked together.

I suggest that the best way to realise how serious was the task before Sir Ernest Simon's Committee is to read one of the fascinating appendices by Professor Mackintosh, in particular Appendix III, which is headed "Comfort Requirements in the Home." Professor Mackintosh is a man who is obsessed with a desire to see the maximum comfort secured for the greatest number of people living in the homes of this country. He is an absolute fanatic (if I may use that word) in his desire to see modern scientific methods used to improve the living conditions of our people, and he is really outstanding in his work in that field. I should imagine that he has been into more homes in this country than any other man. Sir Alfred Egerton referred in his speech to one of Professor Mackintosh's statements in Appendix III, and I should like to repeat it in Professor Mackintosh's own words. It is this (on page 50 of the Report): "In cold weather the British home is the smallest in the civilised world, although its total space compares favourably with what is provided in most countries." That expresses briefly the present-day dissatisfaction with the traditional methods of heating. It refers, of course, to the fact that in the homes of the lower income groups it has not been possible to have more than one fire and that the only living space possible in cold weather is the small area of the house immediately around the fire. Investigations have shown how very wasteful is the traditional open fire and how very efficient the modern designs of heating units can be. A further idea is also implied in Professor Mackintosh's statement. That further idea is the one which Sir Alfred Egerton outlined when, using the jargon which has grown up in this kind of work, he spoke about background heating and the advantage of that from the point of view of the inhabitants of the house, and the facility it provides for topping up in various parts of the house for special work, so that the children can have some privacy for doing their home work and for living their own lives, which, it seems to me, is extraordinarily difficult under some of our living conditions at the present time.

To enable such improved conditions to be provided, not only must properly designed heating appliances be adopted but they must be installed in buildings suitably designed to enable the appliances to work efficiently. This must entail serious consideration of the problem by the designer. The day has gone when the architect can show a more or less standard symbol for

the fireplace and leave it to the building craftsman to fix the exact sizes necessary to fit a fire unit chosen more for its appearance than for its efficiency. Further, the whole house has now to be heated probably from one fire unit, and thus heat losses from the house itself have very seriously to be considered in the design. A recent circular issued by the Ministry of Health draws special attention to this aspect of the problem. It is of vital importance and necessitates the most careful study if the problem before us is really to be tackled.

Therefore, as I see it, the fact that the designer of small houses has now to face is that, instead of it being a simple job which anybody can do (that is how it has too often been regarded in the past), it is a comparatively complicated one, requiring the best technical knowledge which is available. Let us face the further fact that all of us have not yet attained the necessary facility in handling the new data required for efficient design. Some complaints have already been made that these extra human requirements of our time are restricting the architect. Surely these complaints are due to a refusal to face the facts of modern life. The opposite attitude, which I have no doubt will be exemplified at this Conference, is the right one, that these new demands on the skill of the designer will be met joyfully as a real challenge that it is worth while accepting, because it means helping to provide the improved living conditions for our people which we are all so anxious to see brought about.

Except for one item, I have now completed my part in the programme of the Conference. That item is to mention briefly what is being done to implement the other recommendations in the Report of Sir Ernest Simon's Committee. Following the presentation of the Report in March, 1946, the Ministers of Fuel and Power, Health and Works appointed an Interdepartmental Committee, under the chairmanship of Sir Guy Nott Bower, Deputy Secretary of the Ministry of Fuel and Power, to do everything possible to carry out the recommendations. I can honestly say that I do know from inside how very much has been done, how very seriously this Report has been taken and what a tremendous effort has been made to endeavour to implement the recommendations of this Report. With the help of the Ministry of Supply, the whole appliance field is being tackled. Blanket orders are being placed for approved solid fuel appliances and also for gas and electric cookers. The help of the Department of Scientific and Industrial Research, chiefly through the Fuel Research Station, has been enlisted, together with the testing stations of the Gas Light and Coke Company and the Ministry of Supply, to test the appliances, whilst the Building Research Station, together with the Ministry of Works, is doing everything possible to advise on and settle the various building problems which arise. The Health Departments are encouraging local authorities to pay serious attention to the whole problem by circulars on the heat insulation of buildings and the use of the newer heating appliances. Further, a bulletin on district heating, which was mentioned by Sir Alfred Egerton, has been prepared by the Ministries of Works and Fuel and Power, and this also has been issued to the local authorities.

In this brief note I have only tried to introduce the general background and to emphasise why this problem is so urgent and the kinds of difficulties that the industry will have to face. I leave it now to my architect friends who have studied the subject intensively and in detail to discuss with their confrères the problem as viewed by them.

Mr. C. C. Handisyde [*A.*], Senior Scientific Officer, Building Research Station, said: As I understand it, the programme for this afternoon's session is intended to be a summary of the Egerton and Simon Reports in so far as they affect the architect. Sir Alfred Egerton has already covered some of the ground, and a good deal more of it will be covered in to-morrow's sessions, which will deal with appliances and insulation, so I propose to restrict my remarks to considering what the architect must have in mind before he can come to any detailed consideration of the appliances or, in fact, before he can even produce a sketch plan.

Space heating, cooking and water heating must obviously be considered together eventually, but it is simpler, I think, to begin by taking space heating separately.

The two Reports contain a good deal of detail about the requirements of space heating. The present position seems to me to be that everyone agrees that we must have something a great deal better than we had before the war, and the policy at the moment appears to be in favour of some degree of background heating plus topping up in certain rooms when it is necessary. We must, of course, take it for granted that we agree about the need for better insulation of the structure and more efficient appliances.

Background heating plus topping up is excellent so far as it goes, but I think there is one big danger that we architects have to watch. I am afraid that we may become so immersed in the day-to-day details of trying to obtain and then finding out the best way of putting into the houses the new appliances that are coming along at the moment that we may lose sight of what the ultimate object of the heating system should be. For example, at the moment an enormous amount of interest is being taken in the development of the open fire, the use of convection systems in conjunction with the open fire or the development of the open fire to the openable stove, but I think it would be unfortunate if, in getting immersed in the details of how to put those things into the house in the best way, which type of appliance to choose, etc., we lost sight of the fact that neither of those things can be regarded as more than the first stage in an improvement on our pre-war state of barbarism.

I think it might be useful, therefore, to get a clear picture of what the ultimate objective is, and I think we might sum it up as "Comfort, convenience, cost and coal." I deliberately put comfort and convenience first, because I think that householders are really interested in comfort and convenience. Cost and coal are a kind of nuisance that have to be put up with and that we have to deal with, but the ultimate object of the heating system is surely comfort and convenience.

With regard to comfort, a good deal is said about that in both the Reports and in Professor Mackintosh's Appendix to the Simon Report, to which reference has been made this afternoon. It is well recognised now that it is not enough simply to provide a certain amount of warmth; it is almost equally important to provide warmth of the right kind; in other words, we have to have good quality as well as good quantity. Certain factors leading to that are fairly clearly established. For example, we know that the air temperature alone is not even a true guide to whether we feel warm, and it is certainly not a true guide to whether we feel comfortable. We have to take into account radiation losses to surrounding walls or radiation from a heat source. We are told that in a living room the surface temperature of surroundings ought to be about the same as and preferably rather higher than the air temperature. We know that high-temperature gradients in a room are a bad thing, particularly when they occur vertically from floor to head level. We are also warned against excessive radiation to the head, but I think on that subject we need rather more information. We are also told that we should have some air movement but no cold draughts. There is also the question of ventilation, with which I will deal later.

Where do all these things lead us? One immediate conclusion which might possibly be drawn is that a system of heating which relies entirely on convection would be bad, because it probably would not satisfy the first of the conditions that I mentioned, namely, the walls being as warm as or warmer than the air. I think, however, that in spite of the things that we are told in the Reports it is rather difficult to get a clear picture of the sort of positive conditions that we want for comfort.

I think that architects usually find it easier to understand a drawing or a graph than a written statement or a formula, and I thought it might help if I could present, at any rate as a subject for discussion, a sort of pictorial statement of good heating. I am sure that many of you will be familiar with the similarity in the way in which two of our senses behave, that is, the sense of hearing and the sense of seeing. The eye appreciates

increases in lighting, for example, in very much the same way as the ear appreciates increases in noise, and I wondered what would happen if we tried to see whether there was any sort of similar comparison to be drawn between the sense of warmth and one of the other senses. I suggest that there is in fact a very close relationship between the sense of seeing and the sense of warmth appreciation. First, in lighting it is now very well recognised that we must have good quality as well as good quantity. I have already mentioned that that is the case in heating, and I think there would be no argument about that. To go into more detail, some time ago there was a fashion for indirect lighting, but I think that, after a certain amount of experience, it was fairly generally agreed that indirect lighting alone gave a very dull and rather monotonous and dead effect. Quite often now indirect lighting is used, but it is supplemented with some sparkle or bright spots in the form of direct lighting. I wonder whether there is not something rather similar in the case of heating and whether in fact the way in which some people react to the ordinary central heating system, saying that it is wrong in one respect or another, is not in fact due to the lack of sparkle from the all-over central heating at normal times. The practical implication of that might be that we should introduce some high-temperature radiant heat sources to be used in conjunction with our central heating, or possibly some small high-temperature radiant source to be used in conjunction with low-temperature radiant heating as a background. Someone will probably say that the Americans have used a considerable amount of panel heating recently in some of their larger houses, that everybody likes it very much and that they do not in fact add any high-temperature radiant sources. I think my reply to that would be that when the Americans have used a low-temperature panel heating system they have almost invariably done so in houses which have large south windows and in a climate which has a very high sunshine record in winter, and I suggest that that gives the sparkle which brightens up the system and makes it so apparently satisfactory.

In lighting, although the need for some bright spots is recognised, it is also very well known that you must not have glare. The naked light bulb is a most uncomfortable thing to look at, and that suggests to me the reason why I personally cannot sit comfortably in the direct beam of a high-temperature radiant fire. Incidentally, I might mention here one system of heating which was tried out in Portland, Oregon, and which seemed to give very satisfactory results indeed. The living rooms were heated by at least two sources, placed on different walls, each source giving a fairly considerable convection component together with a dull red radiant heat. I think that satisfied the sort of conditions that are suggested by a good lighting system.

We might compare temperature gradient requirements for heating with the known fact that a big gradient in lighting is also a bad thing, and I think we could go further still. What I have tried to do is to suggest a sort of pictorial sense of what comfortable heating might perhaps be.

I think it would be wrong to leave the question of comfort without saying something about ventilation, which is a subject upon which people differ a great deal. It is obvious, of course, that on the ground of economy we should not have more cold air passing through a room than is absolutely necessary for health and comfort. The Egerton Report suggests that, from the point of view of airborne infection, cleanliness of the home and person is more important than air change and that the determining factor in assessing ventilation rates is the need to reduce unpleasant odours, and for that a figure of 600 cubic feet per person per hour has been suggested. In terms of the normal living room, that means about one and a half air changes per hour, which is a great deal less than we used to get with the pre-war open fire, and the difference is just so much waste heat if the air is allowed to go through the room and has to be warmed up in doing so. The suggestion has been made that the additional air required to satisfy the chimney pull should be taken along a by-pass route from outside the house to a point near the fireplace, and no doubt that suggestion will be dealt with at the session of the Conference to-morrow morning. We still do not know, I think, what is the minimum ventilation requirement for comfort. Many people argue against any reduction of ventilation on the ground that the room will be stuffy. Both the Reports mention the need for air movement, and I think that probably air movement is the answer to stuffiness and that ventilation is not necessarily so important. Again I should like to refer to America. In the colder districts there the architects and the householders go to a good deal of trouble to prevent any air coming into the house, because it is so very cold when it does come in. They use weather-stripping round the windows and they have storm windows, but I think it is noticeable that, in spite of the fact that they obviously get a very small air change, their rooms are not in fact stuffy. I know some people will say that they are stuffy. I agree that they are overheated by our standards and that we may be uncomfortable in them because they are overheated, but I do not agree that they are stuffy. I think the reason is that they have more air movement, as a rule, although they do not have more ventilation. I have made rather a point of this, because it brings me to one of the things which I think affects architects very much indeed. I suggest that the Americans have more air movement in their houses because of their typical open type of plan, and therefore I think that, if we are going to change our standards of ventilation, we have to think of the plan in conjunction with the ventilation rate, or, if we are going to change our type of plan for any reason, we have to bear in mind what we may or may not be able to do with our ventilation rate and still get comfort.

That brings me to the planning question in other respects. I have so far discussed only the conditions required for comfort in a room. There is the difficult question of how much of the house is to be heated and to what extent it is to be heated. The present tendency and policy are in favour of a slight degree of background warming throughout the house with topping up locally to give comfort conditions when and where needed. There are three arguments in favour of background heating. The first has already been mentioned this afternoon and I think it is undeniable, namely, the fact that background heating reduces condensation and keeps the house and its furnishings in better condition. Secondly, it makes the hall and the bedrooms slightly more comfortable, and, thirdly, it makes possible the raising of the temperature of the bedrooms reasonably quickly to reach comfort conditions by means of local topping up. I should like to suggest again that we should not lose sight of the ultimate ideal although we are faced with certain particular circumstances at the moment. I do not think that, if you could really have your own way, you would be satisfied with a certain amount of background heat in a room and then topping it up rather than getting full heating wherever you wanted it and when you wanted it from one main system, and I feel fairly certain that the general public will come to that conclusion in time. It may be argued that full heating in a house is a bad thing because we do not want all the rooms warm all the time. I think the answer to that is that if you have a good heating system that does heat all the rooms you can turn it off in some of the rooms if you want to do so. I know the other argument will be that full heating is fantastically costly. I cannot go into that now, but Mr. Dufton is to read a paper to-morrow afternoon in which I think he will deal to some extent with the cost of background heating plus topping up as compared with the cost of full heating.

From the architect's point of view, the really important point on the question of how much heat should be provided throughout the house is the effect it may have on the planning. I do not propose to enter into a discussion of the merits or demerits of different types of house plan and I am not suggesting that a particular type is right, but I think it is important to appreciate that the type of heating that we put into a house does vitally affect the possibilities of planning. So long as we had only an open fire in the living room, that room had to be fairly restricted in size, enclosed by walls and fitted with doors which were usually kept shut, and, in fact, we were confined to the small

semi-circle of space round the fire to which reference has been made. If we provide continuous heating in that room the possibilities of the plan are somewhat changed. We could probably have a larger room and we might open up the plan to the extent of having the living room and the dining room combined in some way. If we have a really warm hall, not just a little background heating, we can open up the hall into the living room-dining room area without feeling uncomfortable. If we do all that and produce a completely open plan downstairs, I think we must consider what effect it will have on the planning of the rest of the house, because clearly, if we break up the normal pre-war arrangement of separate rooms downstairs and make one room there, we shall lose a certain amount of the privacy and quiet which were possible at any rate in the two usable rooms that most of the houses had. The answer that has been given to that is that we should use the bedrooms, and I suggest that if we have the open type of plan downstairs we shall be forced to make more use of the bedrooms for purposes of study and so on. It seems to me that that may possibly affect the economics of background heating of bedrooms, because presumably whether it is economic to have background heating or some other form depends on how often we are going to use the background heating. Therefore I think that, if we adopt the open type of plan downstairs which becomes possible when we raise our heating standards, we have to realise that there is an effect on the heat installation upstairs which must be considered.

There is one point with regard to insulation which I think should be mentioned here. We hear a great deal about the importance of considering the economic value of insulation as a balance between the first cost of the insulation and the saving in fuel, but I think it is important to throw into the balance in favour of insulation the fact that it plays quite a large part in increasing comfort. A well insulated wall will enable us to get more easily the cool air and warm wall effect for which we have been asked. The comfort value of insulation is very well recognised in the colder countries, where insulation is widely used.

Finally, glancing forward at to-morrow's papers dealing with appliances, I would suggest that we have obviously to choose those with a high working efficiency. That is bound to mean that we shall tend to use a more expensive appliance, and in that connection we have to consider, I think, as has been already mentioned, the important point to the householder, which is not the first cost of the appliance but the interest rate on the first cost of the appliance plus the annual expenditure on fuel and maintenance.

There is one point about hot water that I should like to mention. Sir Alfred Egerton referred to the new standard recommended in his Report, namely, 250 gallons of hot water per family per week. The argument has been used against a central hot water supply system (this I think applies to flats and district heating rather than to individual houses) that people would be wasteful if they got unlimited supplies, but there is a very considerable amount of evidence, from actual measurements in a large number of houses and flats on different estates in America, which suggests that that is not the case, at any rate not to an unreasonable extent. Admittedly the usage of hot water increases where people are provided with an unlimited supply for a fixed charge, but the figures show that, whereas in the house where the tenant pays for his hot water by heating the water himself the average consumption (taken over a large number of houses) was 230 gallons per family per week, it went up to 350 gallons when people were given an unlimited supply. Admittedly that is a fairly considerable increase, but it is not an outrageous increase such as some people have suggested would occur if we provided unlimited supplies. It was fairly common to get a consumption higher than 350 gallons per family per week for a short time after the system had been installed, but people soon became tired of the novelty of leaving taps running and settled down fairly generally to the average figure of 350 gallons.

I think the speakers to-morrow will deal with the choice of combined or separate appliances to meet the various requirements for space heating, cooking and hot water heating, but again I would stress the planning implications. Obviously until you know what is being done in the way of combined or separate appliances it is almost impossible to start preparing the sketch plans.

I have not said much about convenience. It is obvious, I think, that we have to make things as convenient as possible for the housewife, and I think it is clear that we are all trying to do that, but, as a glimpse into the future, I think the situation will be somewhat as follows. At the moment we are involved in getting some heat into the house, and the next stage presumably will be the refinement of that heat, getting real comfort conditions as opposed to mere temperature. When we have achieved that, I think we shall have the full force of the householder's demands turned on us in terms of convenience, and I think we should bear that in mind now, so that we shall not be taken by surprise later on.

The President: The following letter has been received from Mr. Robert K. Thulman, of the U.S. Federal Housing Administration, who spent three months in examining domestic heating appliances and equipment in this country last winter:

> "The Conference which you are holding covers so many parts of the overall house-heating question that it is difficult to condense my own comments within the few short paragraphs which I feel are all that I should inflict upon you and at the same time cover the ground fully. It is now six months since I left Britain, during which a great deal of my own time has been taken up with the heating problems connected with our own comprehensive housing programme, but I have been constantly reminded of the identity of the heating problems here with those which I was privileged to study in your country. It is for this reason—that heating of houses in the United States poses many of the same problems that confront you—that I do not feel apologetic in presuming to comment on your programme. Also, the genuine interest in American methods which architects, engineers, Government officials and manufacturers expressed to me during my visit prompts comments which might appear otherwise to be presumptuous. I believe our efforts and yours to improve the comfort and habitability of houses are faced with the same or similar problems, and that those problems can be solved only after a frank and open discussion of them.
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> The two Reports, "Domestic Fuel Policy" and "Heating and Ventilation of Buildings," are an appropriate combination for a single meeting. The first Report endorses the standards set up in the second, and it is these standards and the implications they generate that I question. The concept of 'background heating plus topping up' seems to require the installation of two methods of heating, two systems of heating, or one system plus a number of individual heating devices, while the same performance standard—45-50 deg. F. 'background' with 'topping up' to a full comfort temperature—can readily be accomplished with a single system adequate to provide full comfort and with controllability to accomplish any degree of discomfort the occupant of the house may choose to inflict upon himself. Perhaps it is necessary to warm up the British people gradually and, if this be the case, the two-stage standard may be an interim standard of some value. On the other hand, it is my firm opinion, based on conversations with people in all walks of life in Britain, that the single system, with means to shut off at will the heat in unused rooms, would be a quite welcome improvement. The single system has the added advantage of lower initial cost. The operating cost of the single system is also likely to be less and it certainly cannot be more.
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> "The single system with capacity to heat the entire house requires that the system be designed to operate at efficiencies far higher than the efficiencies of your high-temperature radiant devices if it is to be economically practical. The house, too, must be designed to provide the greatest practicable degree of resistance to the escape

of heat, and your discussion of insulation should be most important. I suggest that it embrace, in addition to its relation to more economical heating services, its relation to greater comfort.

"Heating of the entire house and insulation break down barriers to freedom in planning. The architect is released from the necessity of planning a ground floor consisting of a number of separate cubicles and free to utilise each square foot of floor area fully and economically. Some of your architects are now developing plans along this line. The results in terms of economy, comfort—both of which can be predicted—and public acceptance, which is not predictable, will be most interesting.

"The many large-scale housing developments now being planned and under construction in Britain provide an opportunity to effect economies and provide improvement in comfort through the use of district heating schemes. I would recommend that you encourage more consideration of this method on the part of architects and engineers. To realise the greatest degree of economy it will probably be necessary to forego the fireplace and it is with some fear and trepidation that I even mention it. I recognise that the Britisher's rights to make a lot of work for his wife (rarely for himself) by clinging to a rather messy open fire and to deposit a generous layer of soot over his beautiful countryside are just as inalienable as his right to freeze himself. But I am firmly convinced that your people are not too different from ours and that, given a good job of heating the entire house, they will not use the fireplace even if they have one.

"I have a recommendation to make which bears on the question of public acceptance of heating of the entire house and the architectural plans that result. We have in this country a sizeable segment of British womanhood known categorically as G.I. brides. They have come from all walks of life in the United Kingdom and are now in an equal variety of circumstances here. By next spring they will have experienced an American winter and will have experienced a variety of American heating devices and systems. An inquiry both by questionnaire and by personal interview of a selected sample of G.I. brides to determine their reactions to heating the whole house should be of considerable value in charting the future course of British house heating. I therefore recommend the formation of a party to carry on the investigation described.

"In conclusion, may I repeat what I told you before I left England, how impressed I am with the progressive attitude and forthright approach which the Ministry of Fuel and Power has shown and which are exemplified by the comprehensive scope of the present Conference? I should also like to mention that the same progressive attitude and approach of some of your manufacturers—even some of those whose principal product is the much maligned open fire—have been followed up by personal investigation of American methods here and augur well for the future comfort of the British public. I feel sure that Government and manufacturer progressiveness of this kind cannot fail to accomplish the objectives you seek."

The President, having another Conference to attend, then vacated the chair, which was taken by Mr. Hartland Thomas.

Mr. J. C. Pritchard, Messrs. Bratt Colbran, Ltd., and late of the Ministry of Fuel and Power, said he was very much encouraged by the letter which had been read from Mr. Thulman, because it was very much in line with his personal views. In the main the burden of the Heating and Ventilation Report was the subject of background heating and topping up, which, as Mr. Thulman said, seemed to provide a duplicate system of heating when both were perhaps a little inadequate. He would like to know what were the relative efficiencies of high-temperature radiant heating of any kind. He believed they were very much less than when heat was provided from controlled appliances. The fact that the Simon Committee accepted those heating conditions was rather disappointing, because it encouraged manufacturers, with a few exceptions, to concentrate on trying to improve appliances which in themselves, he believed, were outmoded.

He had been very disappointed to hear the Parliamentary Secretary to the Ministry of Health say that morning that the heating efficiency in terms of coal with gas and electricity was more or less satisfactory. He could not help feeling that the policy indicated was a very shortsighted one, and he would like to hear from the technical people what was the coal efficiency of gas and electricity in the form of high-temperature radiant heating.

On page 126 of the Egerton Report it was stated that 34 per cent. of the people interviewed were in favour of central heating and only 21 per cent. were against it. He thought that was rather significant. The chief objection made by the 21 per cent. was lack of cheerfulness, but he thought that architects could provide cheerfulness in other ways.

At a very interesting exhibition held in Birmingham two years ago and organised by the Ministry of Fuel and Power and the Ministry of Works, showing the implications of heating on the house plan, he had listened to the comments of housewives and had been a little disappointed, because a large number of the women—chiefly elderly women—seemed to demand drudgery as a right and liked stoking their dirty open fires. There was, however, an important proportion of young women who were strongly opposed to that inefficient and dirty form of heating, and he thought it would be well to take notice of their views also. He thought the authorities should be urged to try to have at least some proportion of houses heated in the most efficient manner possible. Experiments had been carried out at Coventry and more would be carried out in other places.

Much of the opposition to central heating was due to a lack of appreciation of what could be done about it. It need not be stuffy. There was no need to keep a house at a temperature of 80 deg. all the time, and there was no need to have all the rooms heated all the time. In fact, most of the objections could usually be eliminated.

Mr. R. H. Rowse, Fuel Research Station, said that Sir Alfred Egerton and Mr. Handisyde had referred to heating in America and he wished to give a very brief sketch of the American practice and background conditions. Heating practice in the United States and Canada was so different from that in this country that it merited a broad and thorough study. Passing reference without context was not sufficient. It was essential that any study should take into account such important factors as climatic conditions, fuel supplies and prices and the attitude which architects, heating engineers and the public had developed towards the heating of homes. In particular, full weight must be given to those factors in making any comparisons between American and British methods and in assessing to what extent American methods might be applicable in this country.

North America was a vast country and the conditions varied considerably throughout the thousands of miles of its length and breadth, but the majority of its inhabitants lived in the colder regions, where the temperature often fell in winter to 30 deg. F. or 40 deg. F. below freezing point but where there was very often much more sunshine during the winter months than there was in this country. It was, however, significant that the heating arrangements demanded by climatic conditions in those regions were, to a large extent, used in other parts of the country where the climate was similar to that in England. Fuels in America were abundant in quantity and in variety, but, in spite of large hydro-electric developments and the availability of natural gas, in some places at only a few pence a therm, and vast supplies of home-produced oil, most of the house heating was done by means of coal, wood and anthracite. There were, of course, considerable local variations.

The general requirements for heating during the winter were that houses should be heated throughout for twenty-four hours a day. In all new houses the heating system was designed to enable a controlled air temperature of about 70 deg. F. to be obtained downstairs, even during the coldest weather, and

perhaps a slightly lower temperature upstairs, but the heating was under control by the occupier and lower temperatures could be used if desired. The heating upstairs could be cut off entirely, but if there was no heating upstairs the temperature might fall far below freezing point. In many of the older houses the heating system was not so refined, but, even so, the heating appliance was kept alight continuously to keep the living room hot and to give some warmth to the rest of the house.

As the outside air was so cold it was essential, in the interests of comfort and health, to eliminate draughts, and it was necessary, in the interests of fuel economy, to limit the amount of cold air flowing into the house, in order to conserve heat. In fact, as Mr. Handisyde had mentioned, houses were made as airtight as possible, but, because of the open plan, whereby there was a free connection between the rooms on the ground floor, there was an amazing absence of stuffiness. He should emphasise that he was referring to small domestic dwellings. Mr. Handisyde, Mr. Pritchard and he had gone into dozens of small houses in different parts of the United States and discussed heating with the housewives, spending some little time in the houses. He was not referring to American hotels and other public buildings, which were often very stuffy, because they were overheated. The American attitude towards ventilation was worth consideration, especially in comparison with that in this country, where there was a considerable flow of air through the house, caused by the open fire chimneys and by the numerous ventilators, cracks and crevices. Some experience in America with the open fire in houses with complete heating had shown that the amount of fuel used on the furnace was increased instead of decreased when the open fire was lit, because of the cooling effect of the increased quantity of air flowing through the house.

As to the appliances and the methods of heating, many of the older houses were heated by means of heating stoves situated in the living room and as far as possible in a central position in the house. Those stoves were kept alight continuously during the winter. They heated the living room by convection and the warm air circulated through open doorways to the rest of the house. No attempt whatever seemed to have been made to provide stoves in which the fire was made visible either by means of transparent panels or by doors that could be kept open. The heating stove was regarded as being only moderately satisfactory. The chief disadvantages were that it was not under automatic control, the warming of the rest of the house was not positive, and the living room was cold at floor level. That had given rise to the expression "the cold 70's," which meant that when the thermometer in the living room was at 70 it was fairly cold at floor level.

In more modern houses heating was done by warm air or hot water, and steam heating was sometimes used in blocks of apartments. When warm air heating was used, the furnace was usually situated in the basement and the air was distributed throughout the house by means of ducts. There were two kinds of system, the gravity system and the forced warm air system. In the gravity system, the warm air circulated under the influence of natural convection, whilst in the forced warm air system circulation was induced by means of a small fan. In the gravity system there were very small forces causing a movement of air; that gave rise to considerable design difficulties and even the heating engineer did not always find it easy to heat the whole house uniformly in this way. There were a number of bad installations. Forced warm air systems, on the other hand, if properly designed, generally gave a much more even temperature distribution, owing to the more positive distribution of air by the fan, and there seemed to be no prejudice against having a fan in the system. The hot water central heating systems were in the main similar to those used in this country, but some interesting developments were taking place in connection with the use of concealed skirting-board radiators. In most houses the hot water was obtained from a furnace in the basement, but in some cases it was taken from district heating mains.

He had not referred to the open fire, because it was not generally regarded as a main source of heat. He thought it was regarded as such in less than 7 per cent. of the houses, and most of those houses were in the Southern States. It was generally looked upon as an expensive luxury and was used only occasionally. It was interesting to note that nowhere in North America did there seem to be any demand for high-temperature radiant heating. The public did not appear to want it, architects and heating-engineers did not generally provide it, and the physiologists had not, up to the present, found any virtue in it. He should add that the sunshine record of North America in winter was much better than it was in this country. The sunshine in the winter months in Washington was about ten times more than in Manchester.

With regard to hot water, the provision of an ample quantity of hot water had long been considered essential in all American houses, and, in fact, nearly all American houses in urban areas had a piped hot water supply.

A study of American heating methods showed how very closely house planning and heating were inter-related. If that relationship and its implications were not appreciated, the success of any new heating systems in this country might be immeasurably restricted.

He had mentioned that the heating furnace for central heating systems was usually located in the basement. In fact, it was one of the prime functions of the basement to house the heating furnace. In addition, it was used for such purposes as fuel storage, clothes washing and, in bad weather, clothes drying, but basements were invariably non-habitable. Basement accommodation was often cheap to provide in the colder regions, as the foundations had to go below the depth of frost penetration and excavating might cost no more than trenching.

The importance of insulation of the structure of a building was fully appreciated from the point of view of fuel economy in the winter and comfort throughout the year. This appreciation was not confined to architects and heating engineers; it was shared by members of the public and by the Administration, which prescribed for all Government-sponsored houses a minimum degree of insulation of the structure, depending upon the prevailing climatic conditions of the locality.

The general attitude towards heating and heat services was that a complete heating system, providing continuous and controlled warmth throughout the house, was essential. The public were alive to these standards and to the advantage to be gained from the proper use of insulation in improving comfort and saving fuel. The strong demand for increased comfort, cleanliness and convenience might be slightly misleading unless it was realised what progress had been made in America in improving the efficiency of heating systems. Direct and rigid comparisons could not be made, but, to give some indication, he thought it could be said that, in spite of the colder weather, houses were heated in the United States continuously throughout the winter with the use of not much more fuel than was employed in this country before the war for a very much lower standard of service.

In the time at his disposal he had been able to present only a very scanty and incomplete description of heating practice in the United States and Canada. Later in the present month the Stationery Office would, on behalf of the Ministry of Fuel and Power and the Department of Scientific and Industrial Research, publish a full Report on Domestic Heating Practice in America, prepared by Mr. Handisyde, Mr. Pritchard and himself after their visit to that country in the winter of 1944-45 to study the conditions there, and he would refer anyone interested in the subject to that Report for details.

Mr. G. L. Rough, Yiewsley and West Drayton Urban District Council, said that he had listened very carefully to everything that had been said at the meetings that morning and afternoon. Being a layman, he could not use technical language, but he was concerned about the facts, and he thought that so far the technicians, the architects and the heating engineers were merely trying to find out where they were going. In view of that, he thought that further experiments should be made in district

heating and in the heating of houses and that they should be made in many of the new housing schemes that were being developed at the present time by local authorities. The local authorities were not so much concerned about the insulation of houses, the radiation of heat in houses, and so on; they were concerned about the cost and its effect on the rent when the houses were let to working-class people, and so far not one speaker had touched on that very important aspect of the question. It had been admitted by all the technicians that the cost of district heating or any other type of group heating would be very high indeed, involving an average increase in rent of about 4s. 6d. per week. That was a very heavy increase for a local authority to consider and certainly a very large sum for the ordinary worker to pay out of his wages.

Professor J. D. Bernal, M.A., F.R.S., said that Mr. Rough had said nearly all that he had intended to put before the meeting. He believed it was necessary to ascertain the facts to which Mr. Rough had referred, and the matter was actually in hand; a good deal of the work had been done, though a report on it had not yet been issued. The practical suggestion made by Mr. Rough should be supported. It was one that had already been considered, and groups of houses were being built at the present moment in order to test the various methods of heating at full scale and with adequate costing. The various Scientific Committees were not quite as much in the clouds as Mr. Rough had implied. The question of capital cost and running cost taken together over a period of years was the criterion for a heating system, and he thought it would be found that in the future suitable appliances and suitable insulation would be regarded not as a luxury but as basic necessities in a house.

Mr. A. H. T. Broderick, Director, Tentest Fibre Board Company, Ltd., said he was sorry that Sir Alfred Egerton had left the meeting, because he wanted to refer to the section of the Report of the Egerton Committee, most of which was excellent, dealing with the insulation of buildings. In his opinion, that section of the Report was very unfortunate. The tone and the content of it, he feared, would do what they were not intended to do. In the first paragraph of Chapter 4 of the Report reference was made to the importance of insulation, and the keynote for the rest of that chapter was given in the last sentence of the first paragraph, which read as follows: "The higher the thermal efficiency and the less expensive the fuel, the less will be the saving attainable by means of insulation." That attitude, unfortunately, went right through the chapter.

Having established this half-price criterion, the Committee applied it in a way which he was afraid might convince most people who read the Report that insulation was a very hazardous sort of thing and a luxury which was likely to be very expensive, but, of course, that was quite contrary to the facts.

Unfortunately the Committee did not touch on the fact that insulation should not be regarded as something which must be added to the structure at additional cost but should be regarded as something which could be used sometimes as part of the structure, without adding to the expense. If insulating board was used for the ceiling instead of plasterboard, insulation would be achieved and would cost almost nothing. Therefore he submitted that the wise thing to do, when a certain amount of insulating board was used, was to use it for the ceiling of the first floor, using the plasterboard for the ceiling of the ground floor, where insulation did not matter so much.

The Chairman said that Mr. Broderick's remarks dealt with a subject which was to be considered at the meeting on Wednesday afternoon. He suggested that Mr. Broderick should put them into writing and they would then be dealt with by one of the speakers at that meeting.

Mr. E. G. Fowler, Architect and Surveyor to the Education Committee, Leicester, said that as the Ministry of Fuel and Power had convened the Conference he had expected that much greater stress would be laid on the subject of fuel. A great deal had been said and written about the heating of houses and many tests had been tabulated, but in the ultimate reckoning there could be no case whatever for burning coal in an open grate at an efficiency of 20 per cent. or for using an electric stove or immersion heater at an overall efficiency of 18 per cent. or a gas fire at an overall efficiency of 25 per cent. (those figures were taken from the Egerton Report) when coal could be burned in a solid fuel appliance in the house, under automatic control, at an efficiency of 70 per cent. In 1938, 45,000,000 tons of coal were burned in houses, and the efficiency, according to the Report, was 20 per cent. If that could be raised to 40 per cent., the Minister of Fuel and Power would have 22,000,000 tons, which, he was sure, would make a great difference to the Minister's economy.

Mr. A. L. Roberts [*F.*], Hon. Secretary, R.I.B.A., said that no reference had been made to the difference in the calorific value of fuels when the quantities used before the war and to-day had been compared, and he submitted that figures which did not take into account the heating power within the fuel which was supplied might be misleading.

He also wished to draw attention to the fact that the fuel supplied to-day was not always of an economic size for the heating apparatus or the fire in which it had to be burned. He himself used coke and anthracite, and the coke came in much too small a size, with the result that it burned through in a domestic boiler much more quickly than the proper size of coke would do.

Mr. D. E. E. Gibson [*A.*], City Architect, Coventry, said that he agreed with Sir Alfred Egerton on the need for dealing with the heating of old houses. As the Conference was a Fuel Conference it should deal with the question of economies in fuel, and it was obviously far more important that the existing houses should be put right than that the smaller number of new ones which were going to be built should be built properly. What was the use of building a relatively small number of good houses that did not pollute the atmosphere if the old houses continued to do so? How could the old houses be dealt with? He could not imagine any private owner taking out fittings which his tenants were prepared to go on using unless there was some inducement offered to him to do so. In certain areas in blitzed cities the matter could probably be dealt with under the 1944 Act dealing with compulsory acquisition, whereby all the properties would become leasehold to one building owner, and if a central heating plant was put down its use could probably be made compulsory. In other cases, unless there was a special subsidy or some inducement in the form of an income tax rebate for improvement of dwellings of specified types, he did not see how the old houses could be dealt with, and he thought that point should be emphasised.

The same remarks applied, he thought, to the new houses. The local authority in Coventry—no doubt like other local authorities—had set out with the best of good intentions to follow the recommendations in the Egerton and Simon Reports, but they had then been faced by the Ministry with bringing the cost down to 21s. 6d. per sq. ft. of floor area, and the very things that had been discussed at the present meeting and ought to be included had had to be cut out. He had been very interested and pleased to hear Mr. Key's statement that the Ministry would in fact support the introduction of things which would save fuel, and he would like that to be noted, because there might be some difference between the directorate of the Ministry and the officers who had to carry out the policy. Insulation, for instance, was obviously an important matter and it could be introduced easily and without great expense, but there was a certain amount of expense to be met, and he thought that either an additional subsidy should be given for it or the local authorities should be told that they must not introduce it and the reason why.

There was one point that he wished to make on the question of the temporary house programme. It had been noticed in Coventry that many tenants were not using the right fuels, such as coke or anthracite. It seemed to him that there should be some tightening up in that connection and that very definite instructions should be given to the tenants and also to the coal

merchants. The tenants were told what fuel they ought to use, but the coal merchants, he thought, very often put them off with other fuels and the tenants used those fuels. That caused trouble in connection with the flues, and, moreover, the tenants were not getting the right efficiency out of their appliances and were making the atmosphere more dirty than they should.

In the housing schemes that were now being carried out he found that under-floor ventilation was seldom used. Cavity walls continued to be ventilated, and he did not think that ought to be done, as it reduced the wall to a 4½-inch brick wall straight away. The possibility of getting some warmth into the solid floors that were now being used owing to the timber shortage should be considered. He suggested the use of no-fines concrete or the use of empty bottles and broken hollow clay partition blocks from the manufacturers' yards, to be mixed loosely with concrete in order to get air cells underneath. He thought that in the rooms where electric heating was used the place for the electric heater was on the ceiling, pointing downwards. That made for the flexible planning of the room and placing of the furniture.

In Coventry twelve months' running of an experimental house, experimentally planned and also experimentally heated, had now been completed. In that house solid fuel was used for the fire in the living room and for water heating, and the heat was taken to the bedrooms for background heating, which was topped up with radiators. The total cost, including electricity for lighting, for the radio, for the vacuum cleaner and the refrigerator, gas for topping up in the bedrooms and an immersion heater for summer-time use, worked out at an average of 9s. 6d. per week over the whole year, the fuel costs being as follows: coke, 60s. per ton; gas, 10d. per therm; and electricity, 3d. per unit. That result would be published shortly and it showed that it could be an economical proposition to get really good background heating all over the house in that way. There must be many estates where the complete heating of houses by district heating could not be done, and the method adopted in the experimental house at Coventry presented a good second best.

NEW APPLIANCES AND ARCHITECTURAL DESIGN

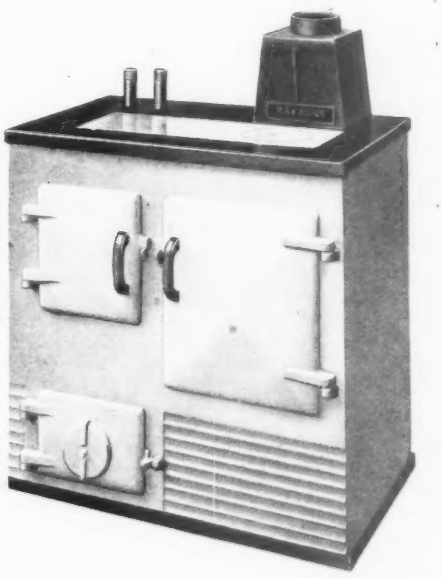
SESSION II. Mr. J. H. FORSHAW, M.C. [*F.*], CHIEF ARCHITECT, MINISTRY OF HEALTH, IN THE CHAIR

The Chairman, in opening the Session, said that in 1914, when coal supplies were abundant, the accepted slogan was "Burn More Coal." The Englishman's home was his castle, and a home could not be a castle without a large open fire. Not only was the roaring fire enjoyed in the mansion, but it blazed continuously in the miner's cottage, although perhaps not so merrily in the latter place because more often than not it was drying wet pit clothes. To have sought efficiency by lower coal consumption in those days, especially in the domestic market, would have been to depress business and to increase unemployment. Consequently, in the parallel industries—the foundries—appliances were produced to burn the generous supplies of those days in large open fires. To suggest now that this use of open fires was ideal was to dote on tradition; to-day the position was reversed and the point had been reached at which it had become expedient, whether we liked it or not, to make drastic economies in our use of coal. To a large extent we had to give up its use in one of the fields in which it was now used, and our only choice was to plan to reduce its consumption in the open domestic hearth. That was another example of circumstances forcing a revolution on us which in any case would be history in a few decades. Posterity would judge us by our ability to adjust ourselves to circumstances in the ordinary course of events as much as by those rare occasions when society achieved a violent revolution.

The change-over of war-time industries to meet a peace-time production of greater magnitude than ever before could not be carried out in a few months. We had to do all those things which Patrick Geddes discovered the French doing after 1870, but in our case we had to do them on a vastly bigger scale. Geddes called that period the "Great Renewal," but we, too, had to renew, create and increase. The pace of progress in the years before the war was not generally realised, nor had its quickening been understood, yet as we approached 1939 the advance was already forcing the adoption of new practices. The long and widespread dislocation of six years caused the disappearance of many old trade methods, and in the near future more would be discarded, giving rise to the introduction of new materials and new processes in all spheres.

The subject under discussion at this session covered but one section of a field in which, in recent years, at any rate, neither the skilled designer nor the qualified scientist had been called to work, and certainly not together. He believed, however, that by this new approach to a problem of everyday concern and because of the urge arising from our present tribulations we should enjoy the comforts and conveniences which science had in store for us perhaps ten, fifteen or twenty years earlier than would otherwise have been the case.

In the art of industrial design progress to-day was rapid and vigorous; it was of our own time and belonged to our everyday life. The danger of flooding the country with large quantities of inferior products was a real one, although it was held in check partially because of the scarcity of raw materials. It was essential to fight against cheap and low-standard fittings if we were not again to see a progressive decline, and the Conference would, therefore, welcome the action taken by the Council of Industrial Design in drawing the attention of manufacturers and of the public to the importance of good design. He had mentioned



Modern self-setting cooker for continuous burning and hot water supply. Usable with any solid fuel.

Closeable fire giving convection and having a sub-floor air supply through hearth.

good design in a general sense, but the Conference was concerned with efficiency, cost and convenience of operation and cleaning as well as with appearance.

The building and equipment of new homes would be the major task before the country for the next ten years and in consequence the demand for heating appliances would be vast and urgent. Light, durable and inexpensive equipment was essential, and by "inexpensive" he did not mean cheap, although cost would be the ruling factor. Secondly, in whatever was designed or planned the tenant's needs had to be kept foremost in the designer's mind and full account taken of the requirements of the work of installation, maintenance and repair. By seeing that those requirements were fulfilled, much would be done for the housewife and for her family.

The following papers were then presented:—

"New Types of Solid Fuel Domestic Heating Appliances and Systems," by Mr, J. S. Hales,

"New Gas Appliances and Architectural Design," by Mr. J. White.

"New Types of Electrical Domestic Heating Appliances and Systems," by Mr, J. I. Bernard,

SOLID FUEL

Mr. J. S. Hales:

The improvement of domestic heating with solid fuel presents two more or less distinct problems, one concerned with existing houses and the other with new houses yet to be built. Although the increased efficiency of modern solid fuel appliances will provide a higher standard of heating and reduced fuel consumption when installed in both existing and new houses, considerably more scope for improvement is possible with the latter since the location of the appliance, the design of flue and hot water service can all be properly designed around the solid fuel appliances to give the highest efficiency and service to the user.

The various improvements in post-war designs as compared with pre-war types, may be summarised under the following headings :—

1. More accurate control over combustion, giving more certain performance and reduced fuel consumption when required.
2. Increased thermal efficiency.
3. Provision in many cases for continuous burning with low overnight fuel consumption, thus giving the advantage of heating throughout the 24 hours with elimination of labour for lighting fires.
4. Ability to burn a wider range of fuels, including many smokeless fuels.
5. Improved multi-duty of solid fuel appliances, whereby one fire will give more than one service, for example, space heating and hot water supply or cooking and hot water supply, or again a combination of all three services. This multi-duty service may include in many cases the provision of background warming to other rooms by means of warm air or hot water coils or radiators.
6. Improved appearance of solid fuel appliances.

Most modern solid fuel space heating appliances have closeable open fires whereby the pleasing features of a cheerful open fire are combined with the efficiency and convenience of the closed stove. Where there is no specific arrangement for closing the fire, provision is made for rapid and easy ignition of the fuel by means of a gas burner built into the appliance. There are three main types of improved open fire type space heaters, namely :—(*a*) The open-close stove. (*b*) The closeable open fire. (*c*) The smokeless fuel open fire.

The *open-close stove* is now made in a variety of designs, incorporating new features which aim at improved control while ensuring good appearance. In some models, the fire doors are arranged to disappear out of sight when the stove is used as an open fire, while in others special doors with permanently transparent windows are used. Most of these stoves will burn coke and other smokeless fuels for which they are primarily designed, and in some cases the firebox is so arranged as to reduce smoke emission when burning bituminous coal. The open-close stove gives the larger proportion of its heat in the form of warm air (convection heating) and in some cases this may be used for warming other rooms. Care is needed, however, to ensure that sufficient heat is allowed to flow into the room in which the stove is placed in order to ensure satisfactory heating of that room, and for this reason in some designs only a proportion of the warm air can be diverted into other rooms.

Another design of closeable fire.

The *closeable open fire* differs from the open-close stove in that the emphasis is more on the open fire appearance with a closure lid or plate to cover the fire when the room is unoccupied or for overnight burning. As in the case of the open-close stove, a high efficiency can be obtained by use of warm air heating (convection heating) to supplement the normal radiation from the open fire. The main advantages of this type of fire as compared with pre-war stool-bottom and hearth grates are the ability to obtain continuous heating at higher efficiency with more accurate control over burning and the consequent wider range of fuels which may be successfully used.

The *smokeless fuel open fire* derives its effectiveness by the design of grate, accuracy of air control and provision for easy ignition. Although primarily designed for burning coke, from which a high radiant efficiency is obtained, a wide range of other fuels can be used, including anthracite and bituminous coal. Some designs of the smokeless fuel open fire also provide warm air heating from the outer casing of the fire thus giving an additional source of heat which may be used either in the room in which the fire is situated or elsewhere in adjacent rooms.

Combined Space Heating and Water Heating Appliances

Nearly all solid fuel space heating appliances can be arranged to incorporate a boiler which supplies either the domestic hot water supply or additional space heating by hot water radiators. When correctly installed, with compact and well insulated hot water tank and plumbing, such a combined system of space heating and water heating provides one of the most economical methods of giving the two services for the small house during all but the warmer weeks of the year. The efficiency and effectiveness of this arrangement, however, depends ultimately on the layout and insulation of the hot water system and this point cannot be too strongly emphasised.

Water Heating Appliances

In addition to the many modern space heating appliances giving water heating as just noted, there is a variety of independent boilers of improved design which give a high efficiency of water heating. In addition these boilers provide a measure of space heating direct from the appliance itself, and, if required, by hot water radiators.

Owing to the present shortage of sized smokeless fuels, the extensive use of the independent boiler is not being encouraged for the time being, but where its installation can eliminate other forms of space heating, it can be both efficient and effective. As with other modern developments, the improvements in independent boilers centre round the certainty of control to give reliable continuous heating combined with better design to reduce labour for cleaning.

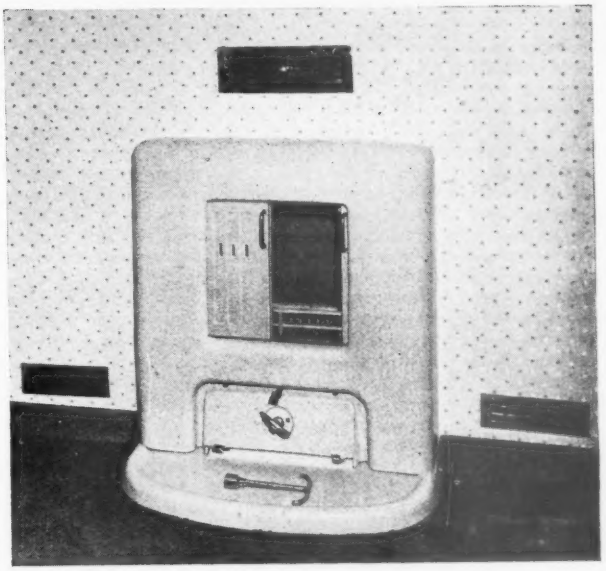
Cooking Appliances

For the small house it is usually more economical to combine water heating with the cooking appliance if this is of the solid fuel continuous burning type Such a combination, given proper plumbing layout, gives a good continuous supply of hot water as well as full cooking facilities. Improvements include better thermal insulation of the cooker with more rapid hot plate heating, and in some cases the elimination of oven flues by the use of warm air oven heating. Accurate combustion control enables a variety of fuels to be burned economically with the minimum of labour for attention.

Combined Cooking, Space Heating and Water Heating Appliances

The latest designs of multi-duty appliances (usually referred to as Combination Grates) whether these are of the side oven or back-to-back types, provide the three services of cooking, space heating by an open or openable fire, and hot water supply. As with other appliances giving water heating combined with other services, the need for compact and thermally insulated hot water systems is of vital importance if efficiency and fuel economy are to be fully realised.

Improvements in these multi-duty appliances cover a wide range including such features as closeable fires designed for continuous burning and air-heated ovens. All provide more accurate control which enable the three functions of cooking, space heating and water heating to be separately regulated to suit the needs of the particular installation. The increased use of some form of closeable fire avoids excess space heating in the living room or kitchen living room when this is not required, and in some multi-duty appliances auxiliary heating either by gas or electricity is incorporated in the appliance for use in the warmer weeks of the year.



Continuous burning openable stove, sliding doors shown partly open. Note fresh air inlets and convection grille.

Complete Housing Units

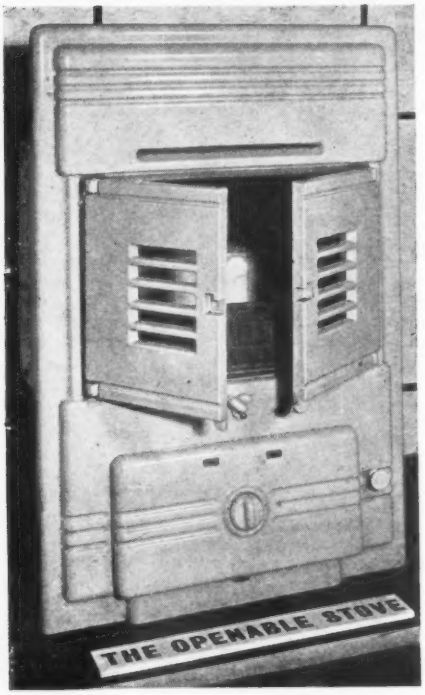
The increased use of prefabricated methods of house construction have had their counterpart in the design of complete house heating systems using solid fuel appliances as the basis for heating. The various units which have been designed all aim at centralising the plumbing and flue system, but naturally vary from one unit to another as to the completeness or otherwise of the equipment included. In all cases the house is built around the central system, although the construction of the house is usually not required to be of special form.

The advantages of such systems are of two possible kinds, firstly the saving of site man-hours by the installation of plumbing, flue and ducting as a prefabricated unit, and secondly, the increase in heat utilisation from the fuel appliance and its associated flue resulting from compactness of design and proper co-ordination of the working parts.

The services supplied vary with the particular system and type of appliance used. For example, general space heating and hot water supply is provided in one case by an independent boiler with auxiliary heating as required for living room and an independent gas or electric cooker. In another example, the combined service of space heating and hot water supply is given by an open-close stove in which warm air is fed to upstairs rooms. In yet another example, the three services of space heating, cooking and hot water supply are provided by a back-to-back grate arranged in a single unit incorporating the flue, plumbing, tanks and electric auxiliaries.

Provision of Chimneys and Ducting

Unlike most other fuels solid fuel appliances require for their satisfactory working, efficient flues and in some case ducting for the admission of cold air and the transfer of warm air to other



Openable stove for building in, providing convected radiant heat

parts of the house. Many new developments or flues are being tried and, as already indicated, it is possible to extract a certain amount of additional heat from their outer surfaces, heat which would otherwise be mostly lost. The methods of construction and materials used in these flues are rather outside the scope of the present paper, but correct flue design is vital to the proper working of modern improved appliances. The provision of ducting for the circulation of air to and from some of the appliances designed for convection heating also calls for care in planning and emphasises again the need for correct location of the appliance in the house if the optimum results are to be obtained.

Background Warming from Solid Fuel Appliances

In the brief description of the various types of improved solid fuel appliance, reference has already been made to the multi-duty nature of many of them. The use of background heating for rooms other than that in which the appliance is fixed is, of course, no new development, but the increasing use of heat extracted from the outer surfaces of many modern appliances, heat which would otherwise be wasted, introduces fresh methods for the more effective heating of the small house.

The amount of heat available is usually sufficient for warming one or two rooms, auxiliary heating by gas or electricity being used for topping-up as required. Appliances of the continuous burning type are the most suitable for supplying background heating since they are capable of giving a steady flow of heat throughout the 24 hours.

Fuel Storage

One of the great advantages of solid fuel heating is the ability to store fuel during the warmer months ready for the heavier demands in the winter, and for this reason alone adequate fuel storage should be provided. Recent recommendations suggest that storage for between one and two tons of solid fuel should be provided, and this should, of course, be covered in to ensure that the fuel is kept dry.

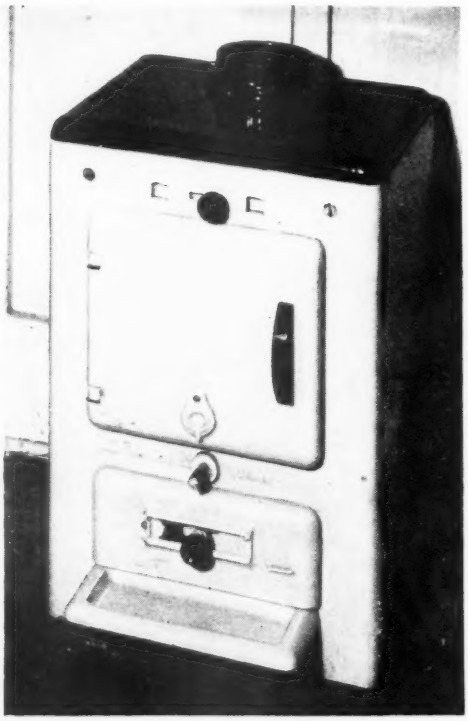
Improved designs of coal stores are available and these aim at providing better means for both delivery by the supplier and easy removal by the user. In many cases separate compartments are desirable to accommodate two types of fuel, and where one of these is likely to be a low density fuel such as coke, a corresponding increase in capacity should be allowed.

Future Developments

Great though the improvements in solid fuel appliances have been during the last year or two it must be remembered that up until fairly recent times solid fuel has been plentiful and cheap in this country and little incentive was given to develop appliances of high efficiency. All that is now changed, however, and the rate of progress of further developments and improvements in solid fuel appliances is likely to accelerate at an ever increasing rate in order to utilise the reduced supplies of coal to the utmost.

The production of larger quantities of smokeless fuel of both the manufactured and natural types which has been forecast will find a ready use in the improved appliances now being designed, many of which give their highest thermal efficiency on these fuels. Alongside these developments one may expect single appliances to burn bituminous coal with greatly reduced smoke emission, whilst the use of centralised systems with pre-formed plumbing and complete house heating services are likely to be of special interest.

Although this paper is primarily concerned with the use of solid fuel, it must be remembered that the other fuels, gas and electricity, are used for certain purposes for which solid fuel is either not suitable or less convenient. From the point of view of the householder the correct combination of the three fuels, solid fuel, gas and electricity, offers the best opportunity for a satisfactory heat service which combines the efficient use of the nation's coal with convenience and low cost to the user.



Modern hot water boiler

GAS APPLIANCES

Mr. J. E. White: The general purpose of this paper is to review briefly the recent improvements in various types of domestic gas appliances, and to direct your attention to the modern conception of the gas heating installation as a whole, which marches with the architectural conception of the functional design of a house as a place for living. Functional design connotes not only an appreciation of materials, their clean handling and appropriate application, but also a clear apprehension of the specific activities which centre in the dwelling house, and which grouped together form the home life of the family. In so far as these activities involve the use of fuel, the Gas Industry can, I think, offer a considerable contribution to their understanding as they affect families of the various income groups and occupations, of varying sizes and composition, and of different "methods of living," as the Housing Manual puts it.

Among the industries concerned with the production and distribution of fuel and of the appliances for using it, the Gas Industry has almost unique opportunities for studying the whole matter. It not only supplies a measured amount of a particular fuel to almost every urban household in the country, but it supplies and fixes, or prescribes the appliances, and has for many years co-operated with the appliance makers in their development. In most cases it maintains the appliances after installation, and is in close touch with the users. Because of its wide and long experience it can, I believe, be of considerable service to the architect.

Production difficulties have so far severely restricted the output of the new appliances, but some are coming through the works, and others are well forward in the immediate pre-production stages. Improvements take the form of an increase in thermal efficiency, easier maintenance and cleaning, more and better automatic control, and better æsthetic design. This applies to a wide range of space heaters, cookers, water heaters, and home laundry appliances. Gas fires are now being made which, in addition to the radiant heat from the brightly glowing open fire, give a further portion as convected heat in the form of a stream of warm air projected into the room and this without appreciably affecting the ventilating effect of the fire although the over-all thermal efficiency is very considerably increased. At the same time the fireclay radiants have been made stronger, and the burners simplified in such a way as to cut down maintenance requirements to a minimum. The Gas Industry places high importance upon trouble-free service and this theme is very evident in the new types coming forward.

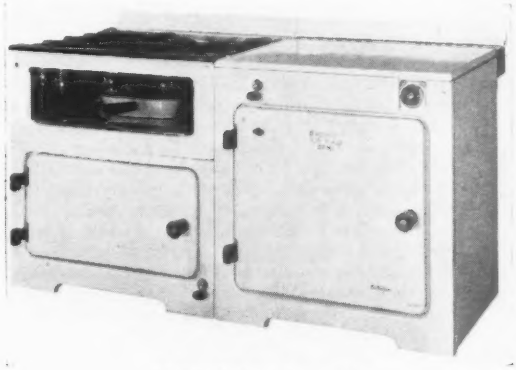
The gas cooker, in its fundamental principles, is not susceptible to radical change. For many years its cooking performance has been such as to give satisfaction alike in the kitchen at home and in the high temples of the culinary art. Improvements in format, in detail, and in appearance in respect of both "in-built" and free standing appliances, have, however, been made, and the post-war cooker is right up to the highest standard of post-war kitchen equipment. The greater use of enamelled outer casings, improved heat resisting enamels which have made it possible to extend this finish over the hotplate, coupled with a general cleaning up of design, have made the cooker more attractive in appearance and easier to keep clean. Complete thermostatic control capable of infinite variation over the entire temperature range is now fitted as standard on domestic cookers; accessibility, simplicity, and reliability, already of a high order, have been further improved. Models with a more convenient positioning of the oven and hotplate, and in some cases incorporating hot cupboards and utensil cupboards, are somewhat held up by the present severe restrictions as to kitchen space and cost, but the designs are there ready for production when circumstances permit.

Improvements in water heaters, in existing types and in new designs coming on to the market, have been directed towards the diminishing of maintenance requirements, others to make them more adaptable to the modern idea of fitted kitchen equipment. Methods for their incorporation as an integral component of the planned hot water supply of the small dwelling have been worked

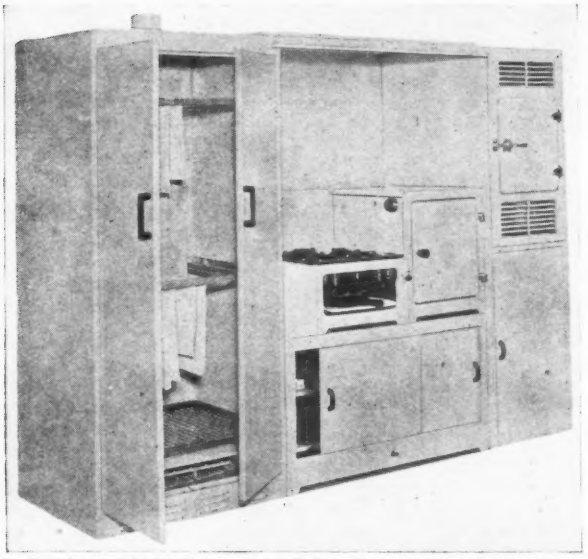
Modern vertical gas cooker

out, and schemes have been developed for a complete hot water service, thus avoiding the limitations imposed by the dual purpose solid fuel space and water heater—further, schemes for the complete summer service, for which the dual purpose heater is manifestly unsuitable, and for a variety of supplementary hot water services, are equally available, and it is important to note that the proposals available are not the result of slide rule approximations as is too often the case in fuel requirement calculations, but are based upon massive district testing under widely different conditions in many parts of these islands. Time does not permit of a detailed presentation of these various systems, but I would urge that the hot water system for the small dwelling should be considered as a whole, remembering that it is in use winter and summer, and that a careful comparison of local fuel prices should be made before a decision is taken, and that the convenience of the housewife should be taken into account. Most men have helped with the washing of dishes in the evening, but not so many are familiar with the washing of the breakfast dishes, and have therefore missed the blank misery of a hot water system that at that particular moment is not what its name suggests.

Our long experience of the housewife's problems, reinforced by many recent discussions between our Home Service Staffs and representative groups of women, leads me to put in a special plea for adequate provision of home laundry facilities. Women's opinion in my own district is overwhelmingly in favour of the provision of a separate wash-house—call it a utility room if you like. Have you noticed how often, in houses of slightly more generous accommodation than those at present building, the garage, if it does not house a car, or if it has a few feet of spare



Modern horizontal gas cooker



Complete gas-fired unit comprising clothes drier, cooker and refrigerator.

space, is made to serve as a wash-house, which is fair on neither housewife nor car?

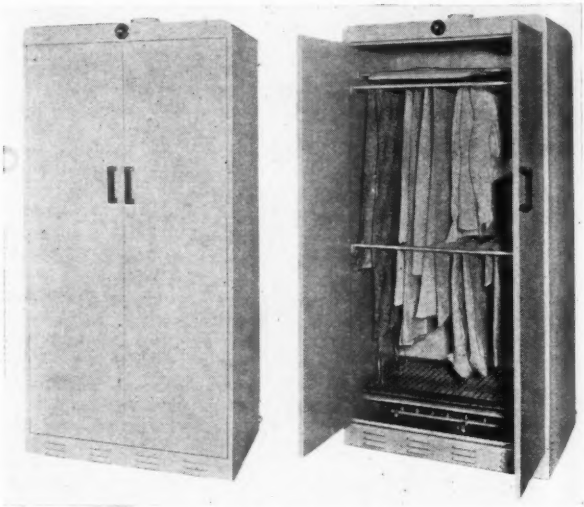
Gas wash boilers have been improved in thermal efficiency, and gas washing machines in design and appearance, but the development of the latter is hindered by production difficulties and the heavy incidence of the Purchase Tax. Especially in hard water districts, the washing machine with agitator and wringer is a very much better proposition than the wash boiler, and despite the fact that in the past a wringer has always been provided by the tenant and not by the landlord, the present tendency to provide more complete kitchen equipment might well be extended to cover it. In any case, either wash boiler or washing machine is worthy of a better fate than to be housed under the draining board.

The outstanding contribution, however, that the Gas Industry can make to the post-war home laundry, and through it to the amenities of the whole household, is the gas-heated clothes drier. Gas clothes driers have been successfully used for many years, but chiefly in large households and institutions. Now their mass production is in hand in sizes and finishes which will fit in with the new standard kitchen fitments—safe for use on either rayons, woollens, or cottons. They are fitted with thermostatic control, which has enabled the rate of drying of a full load of wet clothes to be speeded up to under the hour. The result is that the family washing can be ironed and put away within the one day, and need not be found draping the living room the following day—in fact we have a slogan "Out of the way in one day." It should be noted, and this is a serious matter, that from 8 to 12 lbs. of water may have to be evaporated from a complete washing for a family, and provision must therefore be made by flueing or adequate ventilation for the removal of the steam. In the process of studying a great many designs of clothes driers and of the houses in which they are to be installed I have been astonished to observe how little thought appears to have been given to the ultimate resting place of this not inconsiderable quantity of water. The gas-heated drier of to-day recognises the problem and solves it so far as the design of the drier is concerned, but thereafter the final problem of the transport of the water to the outside atmosphere is, I submit, a matter for co-operation between the architect and the gas undertaking.

Almost within the present century, water supply, water carriage sewage, gas supply, and electricity supply, have progressed from the position of being added extraneously to the plan of the house to being an integral part of the design. Probably the group of services which we class together rather clumsily as telecommunications is making a similar progress. But there is still a good deal of planning and thought required before the functions, the appliances, and the installations are properly correlated with each other and with the working of the household and the general design of the house. The inter-war period houses were certainly an improvement in many cases upon the earlier houses in which scullery, bathroom, etc., were located on the outer wall of a hideous offshoot. Now we have arrived at the stage of the kitchen unit and the plumbing unit. These are excellent things in suitable circumstances, but they are not necessarily a short cut to good planning on all occasions. Integration should be accomplished without loss of flexibility and a house should give its occupants opportunity for different ways of living, and not expect them to conform to a preconceived pattern.

We may recognise that certain fuel equipment and provision for its installation is fundamental, but we cannot pick out certain designs of appliances and say that they will persist as long as (we hope) the house will last. It is obvious that the cooker, water heater and refrigerator are fundamental to the kitchen, and the washing machine and clothes drier to the home laundry. Gas fires are, or will be, essential to the sitting room, the bedroom-study, the sick room, and the old people's bedroom. Improvements in design and installation methods have solved the related problems of heating and ventilating these rooms. Their layout need no longer be governed by the multiflued chimney stack carried from the foundations straight through to the roof. The new panel fires can be fixed flush upon the wall at any convenient height. They are silent, cannot "light back," and are unaffected by dust and fluff. The method of fixing them to the wall has been simplified and is in the process of being standardised. They can be flued by a 30 sq. in. area concrete block flue in the thickness of the wall, which can be placed in any convenient position (the corner position in a bedroom is often particularly convenient), and continued by asbestos cement flue pipe across the roof space to a convenient stack or ridge tile. It should be noted that a flue or ventilating shaft of 30 sq. in. area is the method of ventilating bedrooms recommended in the B.S. Code of Functional Requirements for Dwellings.

Summing up, I have tried to show that just as improvements in design have resulted in better individual gas appliances, so a broader view of the fuel using installation as a whole will result in a better deal for the housewife and a fuller and freer home life for the family. Nor should it be forgotten that the complete abolition of smoke is essential to restoring and preserving the beauty of our land. This sentiment is one to which, I fear,



Gas-fired clothes drying cabinet.

we pay lip service but still only temporise in our efforts to end. At this Conference yesterday I had an opportunity of speaking upon the contribution which gaseous fuel has made towards smoke abatement and the facts given them are perhaps worthy of reiteration. In 1935 my undertaking processed 120,000 tons of coal in the production of gaseous fuel for industry ; ten years later the figure is 340,000 tons. The effect of this change-over is very much in evidence in the industrial sky of Tyneside, but industry, especially heavy industry, does not take a step of such magnitude for no reason other than the good of the health of the district—there usually has to be some good sound financial benefit in the picture. In conclusion, therefore, I want to suggest that since it pays industry to do its job better and abolish smoke at the same time, it equally will pay the designers and occupiers of the homes of the future to take the same courageous step, towards which there can be no better guide than the members of the Royal Institute of British Architects.

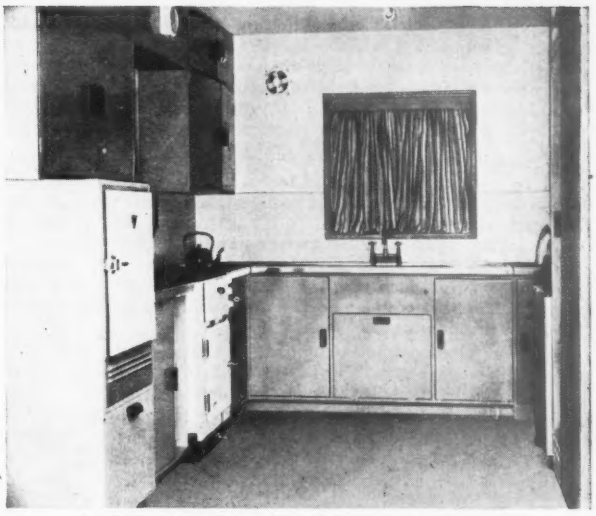
ELECTRIC APPLIANCES

Mr. J. I. Bernard, *Chief Technical Officer, British Electrical Development Association :* Although dependent so far mainly on fuel-burning power stations, electricity itself is a form of energy. As such it can be instantly transformed into heat by the simple process of passing a current through a wire. Every unit of electricity must produce a definite amount of heat, irrespective of the size of the apparatus, and practically any temperature can be developed depending upon the proportions of the heating element. This flexibility in design explains why electric heating is usually applied in separate appliances, each made for a specific purpose and for installation in the most convenient position chosen by the architect. Electricity therefore imposes no restrictions on architectural design ; in effect it gives the greatest possible freedom in planning . . . . I should like to digress for a moment to deal very briefly with a question which was raised yesterday afternoon in regard to electricity. Although electrical heating appliances work at very high efficiencies—in many cases 100 per cent.—it is said that the coal economy efficiency may be lower than in some other methods of heating. I should like to point out something which is often overlooked, namely, that all coal is not the same and that power stations generally use the poorest grades, which cannot be used for any other purpose. In other words, such arithmetical calculations may not be comparing like with like. The only stipulation that the electrical engineer, who is constantly striving to obtain higher generating efficiencies, would make is that high grade energy should not be wasted in structures which lose heat rapidly, or in poorly designed hot water systems.

Modern Electric Space Heating Appliances

Electric fires, both of the portable and wall-mounted types, are being produced in an increasing variety of patterns, their high temperature elements giving out a large proportion of radiant heat of the kind that is so popular in our relatively damp climate. Some new reflector type electric fires are designed to radiate their heat over a wide arc—120 deg. in plan—so that persons sitting at the side are warmed as well as those in front of the fire. Wall-mounted fires are designed for fixing on the wall without the need for a recess or cutting away and the convection air currents are thrown forward so as to avoid staining the wall surface above the fire. Electric convectors, i.e., the type of heater in which the elements run at a relatively low temperature and most of the heat is used to warm the air, are made in both freestanding and inset types. They should preferably include a built-in thermostat since automatic control is always desirable when non-luminous elements are used. Tubular heaters, also low temperature wall panels, are available for cases where lateral distribution of warmth is required, as under large windows to stop down-draughts and check the sense of chill.

The choice between the different kinds of electric heater depends to a large extent upon personal preference. Electric fires are generally satisfactory provided that the house is well built from the point of view of low heat losses, which should be taken as meaning not only insulation up to the values of K = 0.15 – 0.20 recommended in Code of Practice, Chapter VIII, but also the insulation should be applied, or the interior wall surfaces finished, in such a way as to reduce the thermal capacity, thus enabling conditions of comfort to be attained in the shortest possible time. If, however, additional " background " heating is needed, electric convectors or other low temperature heaters are a very simple means of solving the problem. In small houses, a convector of 1½—2Kw. standing in the hall provides a measure of central heating for the whole house during the coldest months.



Small electric kitchen with vertical cooker, refrigerator and washing machine in recess.

Electric Water Heating

The design of installations for small houses can be conveniently divided according to whether electricity is the sole source of heat or used in conjunction with a solid fuel-fired system.

All-Electric Systems

A factory-made electric water heater, which consists of a well-insulated storage vessel fitted with heating element and thermostat for automatic control, should be used in conjunction with an efficient layout of piping. Electric water heaters are made in capacities varying from 1½ and 3 gallons—suitable for a sink and basin—up to 12-100 gallons capacity for supplying all the taps in small or large houses. A new type of electric water heater made by a number of manufacturers under various names such as " Two-in-One," " U.D.B.," and more generally " Dulec " has been produced specially as a contribution to the post-war housing programme. It is made in two sizes, 20 and 30 gallons capacity, and is fitted with two heating elements ; one near the top keeps hot sufficient water, about 6 gallons, for ordinary domestic purposes, while the second element at the bottom of the cylinder is switched on when larger quantities of water are needed for hot baths or on washing day. The optional reduction in the quantity of hot water stored when the demand is low ensures the lowest possible consumption of electricity.

The 20 gallon Dulec heater has been specially designed with a diameter of 20 in. and a height of 33 in. for fixing under the standard kitchen draining board—a convenient out-of-the-way position, which has the great advantage of cutting down the length of pipe to the sink tap. As this is the most frequently used tap, appreciable economy in pipe losses is effected and the user finds that the water runs hot immediately. The Dulec heater is fed from a ball-valve cistern in the usual way and a

vent pipe is connected to the outlet. Pipe runs to bathroom taps should be kept to a reasonable length as will naturally be the case if the bathroom is fairly close—in a vertical or horizontal direction—to the kitchen sink in order to economise in pipe and drainage connections.

COAL-ELECTRIC SYSTEMS

If electric heating is to work in conjunction with a solid fuel-fired boiler, supplying all the hot water in summer-time and supplementing solid fuel when required, the whole arrangement becomes more complicated and care is needed to obtain economical results with electricity. The cardinal principle is to design the dual system so that it is efficient from the electrical point of view in which case the heat losses are bound to be less when the coal fire is in use. The general layout should include the following points :—

(i) The electrically-heated storage vessel must be fixed at a sufficient height above the solid fuel boiler to ensure that the boiler-to-storage circulation will not reverse when electric heating is in use, so causing electrically-heated water to be circulated through the cold boiler, which would cause excessive heat loss.

(ii) Any circulating loops to radiators, towel rail, etc., should have their flow pipe branched off just above the boiler and not taken from the top of the storage which would permit electrically-heated water to circulate, causing unwanted and probably large waste of heat. This applies irrespective of whether the hot water system is of the "direct" or "indirect" type.

(iii) No draw-off piping, *e.g.*, to the kitchen tap, should be connected to the boiler flow pipe. Such connections which were sometimes used in the past either to save piping or with the idea of getting hot water more quickly after lighting the fire, are definitely unsuitable when electric heating is used because, being below the level of the hot storage, only cold or luke-warm water will be obtained at the taps so connected.

The most efficient method of applying electric heating is to use a self-contained Dulec heater of 30 gallons capacity (20 in. diameter, 47 in. high) which has connections for the boiler flow and return pipes and is fitted with brackets for mounting on the wall above the boiler.

IMMERSION HEATER

In converting a storage tank by fitting an immersion heater as an alternative to a solid fuel boiler, expert advice should be obtained as there are a number of pitfalls which may trap the plumber or hot water fitter, who is inexperienced in electric water heating technique. A mistake in a single house may not be costly to rectify, but in these days, when hundreds or thousands of houses are being built to a standard design, it is more than ever desirable that the architect should provide adequate space—at least 3 in. on all sides and on top of the tank or cylinder—for effective heat insulation and make sure that the layout of the piping has been approved from the electrical point of view. Electricity supply authorities can give valuable advice, including experience of the effect of local water, whether hard or soft. Properly designed electric water heating installations require a negligible amount of maintenance and give an automatic constant hot water service with standing losses so low that the consumption of electricity is practically in direct proportion to the amount of hot water used.

Electric Cookers

New models which have been designed since the war are notable for a number of improvements introduced mainly as a result of surveys of user opinion. They include : thermostatic control of oven temperature ; a quicker heating-up of the oven ; rapid boiling plates : simmering controls for the boiling plates ; increased grilling and warming space.

The electric cooker with its flat top has always been easy to keep clean, but in post war models attention has also been paid to the elimination of corners, ridges and beadings so as to increase still further the ease of cleaning. This greater simplicity of outline is being aided by the greater use of pressed steel in place of castings. An added refinement for those who desire it is a time-switch which allows the housewife who has to go out for the morning or afternoon to put a meal in the oven and set the time-switch to switch on at a predetermined time and also, if necessary, to switch off when the meal is cooked.

Post-war cookers of the vertical type are being made to conform to the standard dimensions of kitchen fitments, namely, 21 in. wide, 21 in. deep and 36 in. high ; they will have flush sides so that if necessary they may be inset between counters or cupboards, thus assisting the architect still further to improve the utilisation of space and eliminate gaps which are difficult to clean between fittings. From a kitchen planning point of view, it may be noted that oven doors are usually hung on the left-hand side and an electric cooker can be placed anywhere in the kitchen, its installation merely involving the provision of the necessary wiring and its operation being unaffected by draughts or other external conditions.

In order to meet the user demand for an oven at a higher level to avoid stooping, an increased number of post-war cookers will be available in either the side-by-side or buffet type, the dimensions of which will be 44 in. wide by 21 in. deep.

The maintenance of post-war cookers will be greatly facilitated by replacement parts such as boiling plates, etc., being made by all manufacturers to Interchangeability Specification sponsored by the Electrical Development Association.

Refrigerators

New designs include an inset model of family size (4 cu. ft.) intended to be fitted in a range of storage cupboards at waist height so that all the contents can be easily inspected without stooping. The standard dimensions will be 24 in. wide, 19 in. deep and 42 in. high. The compressor unit is mounted above the cabinet so that it can be removed complete with the freezing chamber for ease of maintenance. With a refrigerator of adequate size and suitable accommodation for vegetables (which may take the form of a ventilated cupboard under the inset refrigerator) there is really no need for the conventional larder since other foods are mainly groceries which are more conveniently kept in suitable dry storage cupboards in the kitchen. If, however, a larder is thought necessary, it can be much smaller and planned so as not to encroach on kitchen space which is at a premium in small houses.

The electric refrigerator which is being specially manufactured for the Ministry of Works is also of the inset type with a capacity of 3 cu. ft., the largest ever made to be accommodated under a working counter or draining board 36 in. high, within the standard 21 in. module for width and depth. In addition to the above new inset models, electric refrigerators will be made, as soon as manufacturing capacity becomes available, in the usual freestanding cabinet types.

Laundry Appliances

Electric washing machines and wash-boilers are being standardised in size so that they can be accommodated under a draining board and if necessary used in that position in order to simplify the washing process. The latest designs of washing machine avoid the need for a wringer by running the tub at high speed to remove most of the water by centrifugal force. An automatic model has been produced in which the whole sequence of operations, soaking, washing, rinsing, and partial drying is carried out with no more trouble to the housewife than the setting of a control dial.

In many parts of the country where outdoor drying of clothes is often spoiled by rain or a smoky atmosphere, there is a demand for indoor facilities. There are freestanding drying cupboards of steel available, but there is no necessity to install such an expensive article in new houses ; a drying cupboard can be constructed approximately 2 ft. square on plan, either 6 ft. 6 in. or 8 ft. high, the interior finish being smooth hard plaster. The inside of the door, floor and ceiling can be lined with glazed asbestos sheeting or similar material and the cupboard should be

ventilated top and bottom so as to permit air circulation, the damp air being preferably discharged to the outside by means of an extract fan. The base of the cupboard is fitted with a suitable electric heating unit controlled by a three-heat switch to allow the drying rate to be varied according to the load; on low heat, it can also be used for drying off wet outer clothing.

New Wiring Systems

It is now generally recognised that convenience and, in some cases, economy in the domestic use of electric light, heat and power was seriously hampered by the lack of plug points in small houses built before the war. Much thought has therefore been given to the development of wiring systems which provide better facilities without serious increase in cost. The most notable departure from pre-war practice is the connection of a number of plug points to a single wiring circuit which is fed from both ends, thus doubling the effective size of conductor and obtaining the greatest possible diversity in loading. "Ring main" wiring as it is called has been officially approved in the 1946 Supplement to the Wiring Regulations of the Institution of Electrical Engineers which permits an unlimited number of socket outlets in small houses not exceeding 1,000 square feet, to be connected to a ring main having a certain size of conductor which was previously permitted to supply only one heating socket.

A Universal Plug

The ring main system of wiring can only give the greatest convenience to the user if all the socket outlets are of the same size and suitable for supplying every kind of domestic apparatus from lamps and clocks, which only take a small amount of current, to the largest electric fire. In order to afford proper protection against overload or short circuit, the plugs for attachment to the flexible cords of the lamps or appliances, are each fitted with a separate fuse; this has the further advantage to the user that the effect of a blown fuse will be confined to the faulty piece of apparatus, instead of cutting off the supply of current to a number of sockets. The new fused plug designed to supply up to 3Kw. will therefore, be more convenient in every way.

Number of Plugs

In view of the reduction in cost of installing a larger number of plug points, there is no reason why even the smallest house should not be provided with an installation adequate for the use of all the electrical appliances which will be employed during the life of the house. As a general rule, a minimum of three plug points should be installed in every living room and double bedroom, two in single bedrooms, and additional connections where needed for water heating, refrigerator and laundry appliances. Wiring for an electric cooker should be provided as a separate circuit on account of the heavier load (6-8 Kw.), all the other points consisting of the new 3 Kw. socket outlet.

Electricity Supply Control

Another notable advance is the development of the E.D.A. standard House Service Unit embodying in one compact assembly, the Supply Authority's main fuse and meter, the consumer's main switch and circuit fuses. The design is suitable for mounting on the surface in a position convenient for meter reading and fuse replacement, the space occupied being 18 in. wide by 24 in. high. Alternatively, the Unit may be mounted in a shallow cupboard recessed in the wall, the brick opening being 1 ft. 10½ in. wide by 3 ft. high.

Conclusion

The brief outline that has been given shows that the principal domestic electric appliances have emerged from the formative stage and have reached a degree of standardisation in regard to space occupied which is of considerable assistance in detailed planning. The electrical industry, however, is not content to rest upon its laurels—the fluorescent lamp is an obvious example of technical progress—and further improvements in the performance of heating appliances may be expected in the years to come, but to-day's designs, based on wide experience of the use of electricity in small houses, offer a valuable contribution to the provision of well-planned houses and the abolition of smoke.

THE INFLUENCE OF NEW APPLIANCES AND SYSTEMS ON ARCHITECTURAL DESIGN

John Pinckheard [*A.*]: In the past we have, I think, always been rather prone to consider small houses as relatively simple and uncomplicated problems. To-day, when perhaps more intensive research into the design of houses is going on than ever before, we are discovering how little in fact we know. Some of us perhaps heard a well-known scientist observe recently that we hadn't found a really satisfactory definition for "fresh air." Domestic heating in particular is one of those things which architects have taken for granted. To-day the impact of a serious fuel shortage and the appearance of new non-traditional forms of construction are forcing us to think much more seriously about domestic heating and about thermal insulation.

As we have heard this morning a very great deal of work has already been done by the scientists and by industry. Architects now, thanks to the work of the Egerton Committee, have for the first time a clearly stated programme of heating requirements.

Laundry-utility room with electric washing machine and electric drying cabinet

At the same time we now have, as we have heard from the previous speakers this morning, a range of heating appliances with an efficiency often far in excess of anything available before the war. I want to say a little about the influence of these new standards and these improved technical resources on the work of architects. The method of heating has had a tremendous, and I think often unsuspected, influence on the evolution and development of the house—and even on its interior decoration and furnishing. The changes in heating technique to-day—in particular in the case of solid fuel burning appliances—we can be certain will be reflected unmistakably in the houses of the immediate future.

At the outset, I want to make clear that I believe that technical innovations will succeed each other at an ever-increasing

pace ; and that architects more than ever in the past will continually be having to adapt their designs to take account of these changes. I think, therefore, that we should be making a very great mistake if we were to regard our new standards and new appliances as in any sense static. Nevertheless, while the architect must keep his eye on the future and watch the direction in which technique is moving, he must also master the detailed implications of the contemporary advances in building practice. I make no apology therefore for plunging into some of the more detailed problems with which architects are faced to-day.

It is possible to single out several aspects of the new domestic heating practice—the heating practice, that is, which is recommended by or implicit in the Egerton Report—each of which will, I think, have its effect on post-war domestic architecture. In particular I would select the following :—

(1) The conception of background heating.
(2) The trend towards the use of a single appliance for the main space heating and water heating load.
(3) The use of convected air for heating.
(4) The controlled introduction of fresh air for combustion.
(5) The introduction of new types of flue construction.

I should say that I am for the moment regarding all these factors from the rather narrow standpoint of our immediate housing problems.

Background Heating

The recommendations of the Egerton Report are based on the acceptance of a method of heating which is familiarly described as "background heat plus topping up." The main effect of background heating will be to increase the usable area of the house. The practice of limiting adequate space heating to one or two rooms meant in effect that family life became restricted to that part of the house—often only to the living room or that part of the living room nearest to the fire. Such a state of affairs is socially objectionable, apart from the obvious waste of space. The family which has hitherto been concentrated into a single small area in the living room by the attraction of the one and only adequately heated zone will be able to spread out over the whole area of the house.

With heating throughout the house, and a draught-free heating appliance (to which I shall refer later) we can expect to see an opening up of the main living area of the plan on the ground floor level. And parallel with, and complementary to, this tendency will be an extension of the functions of the upstairs rooms, to satisfy the needs of privacy, and to provide for work and study as well as for sleeping.

The Single Multi-Duty Appliance

The second aspect about which I want to speak is very closely related to the question of background heating. One of the most noticeable changes in the plans of post-war houses—apart from the improved standards of floor space—arises from a general trend towards the use of a single multi-duty heating appliance operating on solid fuel. This is a trend which is reflected in many of the type plans circulated by the Ministry of Health, in the recent official restriction on the use of more than one solid fuel burning appliance per house, and, of course, in the production of prefabricated heating units designed to give a complete heat service.

The Eclipse of the Open Fire

One of the more unpopular implications of the single solid fuel appliance is, of course, the tendency to replace the open fire by the openable stove. The closed stove (or the openable stove) delivers more useful heat for a given quantity of fuel than does the open fire—even including the new improved designs—and in the present national fuel situation this advantage may prove decisive, notwithstanding the deep-rooted preference for the traditional open fire. It will be interesting to see how far people are prepared to sacrifice a warm house for the sake of the local warmth and the visual stimulation of the open fire. Architecturally, the effect of the eclipse of the open fire would be, I think, to deprive the room of its customary focus and to stimulate the creation of some alternative centre of interest quite dissociated from the source of heat. Perhaps the television set will fill this need.

Location of the Multi-Duty Appliance

The multi-duty appliance will frequently be required to provide space heating up to full comfort conditions in the room in which it is situated, with background heating to the adjacent ground floor room, background heating by warm air to the two main bedrooms and an adequate supply of domestic hot water. The fulfilment of these requirements is best achieved when the appliance is located centrally in the house. The typical pre-1939 plan with its familiar fireplaces ranged against the party wall, beloved by local authorities and speculative builders alike, is a particularly unsuitable one for heating from a single main source, and it seems likely that this type of plan will be largely superseded by one with a central stack.

Means of Access

With this type of installation the question of access becomes of special importance. Access is required to the back boiler and the plumbing connections, and to the auxiliary water heating appliance which may frequently be placed in the space behind the main appliance. Once again, the centrally placed stack has the advantage since it facilitates easy access to the appliance from the rear.

Water Heating

The incorporation of water heating with the main appliance has encouraged the adoption of a more efficient layout and more efficient insulation for the domestic hot water system, and in particular has resulted in bringing the cylinder close to the boiler in order to minimise the length of flow and return pipes. Admittedly this arrangement may result in longer draw-off pipes but generally the heat losses from the draw-offs are more than balanced by the saving effected by a short flow and return. There is a tendency, therefore, for the cylinder to be fixed on the ground floor rather than the first floor, in which case it can be conveniently installed in a cupboard adjoining the main stack.

Some means of auxiliary water heating are highly desirable, especially in the summer months, and either an electric immersion heater or a gas circulator can be provided. If a gas circulator is adopted it can often be fitted into the space behind the main appliance or it can share the cupboard with the hot-water cylinder.

Chimney Sweeping

The question of chimney sweeping is one which requires careful attention, especially where closed stoves are used. Sweeping from the front may be difficult, especially if the stove has a flue adaptor which is much offset or where the stove itself is low down. The provision of means of access to the back of the stove previously referred to suggests the possibility of sweeping from the rear.

The Use of Warm Air for Heating

Where a single multi-duty appliance is installed warm air will be the normal means of supplying background heat to the upper floors. The influence of the single appliance on the small house plan has already been considered and the use of warm air as a supplementary means of heating underlines the arguments already advanced in favour of the central stack. The main vertical warm air duct, associated with the stack, becomes an essential element in the plan and more and more the tendency is for the house to be designed with the heating system rather than the heating being added to a previously determined plan.

Typical Layout

In a typical installation the heating appliance is surrounded —except at the front—by a shrouding. The enclosed space constitutes a convection chamber where air drawn in at the base is warmed by contact with the hot surfaces of the heating appliance. A vertical duct—frequently formed by the shrouding to the main flue—conducts the warmed air to the bedrooms

above. A well-designed installation on these lines will be cheaper in first cost than a hot-water heating system, it can be highly efficient in operation, and it requires a minimum of materials which are now in short supply.

Avoidance of Excessive Air Change

It is important to remember that the forces causing the warm air to rise in the ducts are very small in comparison with those due to wind pressure and chimney draughts. For this reason the design of the ducting, the placing of the inlet and outlet grilles and the avoidance of excessive air change are matters requiring the most careful consideration. Where the source of heat is an open fire it is highly desirable that at least part of the air required to feed the flue is drawn from a source outside the room. I shall deal later in more detail with this question in considering the implications of the open fire.

Intake Duct

The air used in the warm air ducts may be either fresh air drawn in from outside, or partially warmed air drawn from inside the house. The objection to drawing in outside air is that it will be unnecessarily cold and that to allow this air to enter the house an equal volume of warmed air must be discharged to waste. A further objection is that with an intake on an outside wall the circulation is much more liable to interference by wind pressure.

The alternative system where air is drawn from inside the house largely avoids these objections. It would be a mistake to suppose, however, that the same air is continually recirculated. A proportion of the warm air delivered to the bedrooms is being continually dissipated through flues, cracks, air bricks and so on; and of course, must be if adequate ventilation is to be maintained. The most that it is safe to claim in this respect for the internal intake is that it probably reduces the rate of air change as compared with the intake from outside the house. The recommended situation for an internal intake is in the hall. Here the air is less likely to be laden with cooking and tobacco smells, and also the risk of draughts is less objectionable here than in other parts of the house. The intake duct should deliver cool air at the lowest point in the convection chamber and if possible immediately under the hot base of the heating appliance.

Delivery Ducts and Outlet Grilles

The ducts from the convection chamber delivering warmed air should be always vertical. Horizontal ducts are to be avoided. Experience with horizontal ducts has been conspicuously disappointing.

Generally speaking, the duct will not supply two or more grilles simultaneously at different levels. The higher grille will tend to rob the lower. It is essential that the grilles are closeable at will by a hit-and-miss device so that warm air can be directed as required. In the typical three-bedroom plan grilles can normally be provided to two out of the three bedrooms. They should be kept away from windows and fireplaces, and as low down to the floor as practicable, providing always that where fireplaces exist the inlet grille is above the level of the fireplace opening.

There should be always a warm air outlet in the room in which the heating appliance is situated, so that the occupier can deflect the whole of the available heat from the appliance into one room. If this is not done, there may be hardship where the tenant is unable to buy sufficient fuel to provide background heating throughout the whole house.

The problem of sound transference through ducts is one of the most difficult to overcome. Not only may sound travel across the duct between rooms on the same level but also up the duct from the ground floor rooms to the bedrooms, unless careful baffling arrangements are incorporated. This is one of the aspects on which research is needed and one on which I hope the B.R.S. will soon be in a position to give us some guidance.

Materials and Construction

Ducts can be constructed of any incombustible material not likely to corrode. Galvanised steel, asbestos cement, brick or concrete block are all suitable. Fibre board, black steel, plywood or timber are not suitable.

The Controlled Admission of Air for Combustion

The controlled admission of fresh air for combustion has particular relevance for the type of installation we have just been discussing, but it is an advantage in connection with almost any solid fuel burning appliance. It has always been the practice in the past for the solid fuel burning appliance—generally the open fire—to draw the air necessary for combustion from the room in which the appliance is situated. As a result a large volume of warmed air is continually drawn up the flue, to be replaced, of course, by an equal volume of cool air which finds its way in through the room.

The open fire which has always been commended as a highly efficient means of ventilation is now recognised as a particularly bad offender in inducing excessive and unnecessary air change in the room. An open fire in a typical living room will induce some five air changes per hour. The normal requirements of ventilation will be met by roughly 1½ air changes, so that warm air is being extracted from the room three times as fast as is actually necessary for proper ventilation. The importance of preventing this continuous discharge to waste will be appreciated when it is remembered that air change is normally responsible for about a quarter of the total annual heat loss.

There is a second consideration also to which we should pay attention—though it is not one to which a precise cash value can be attached; that is the question of the prevention of draughts. Architects have always been aware of the connection between open fires and draughts—an awareness which is reflected in house plans, in the placing of the fireplace away from doors and windows. It is highly questionable whether the placing of the fireplace can *prevent* draughts; the best that planning can do, within the limits of traditional practice, is to localise them. If the fire is to burn, then somehow air must find its way from the outside of the house to the inside. No amount of curtaining or draught excluders can provide a remedy.

The problem for the architect is to conduct a stream of fresh air to a point close to the fireplace without permitting it to pass at high velocity past the legs and ankles of the occupants. The satisfactory solution of this problem will, I think, have an influence on placing of the fireplace. Once we have achieved the draught-proof fireplace we shall have a greater freedom in positioning it. We shall not be influenced by the positions of door and windows. The fireplace with its own independent guaranteed air supply can be located in the rooms irrespective of the position of other openings—free standing in the middle of the room for example—without any fear of discomfort of the occupants.

One of the difficulties encountered in providing fresh air ducts arises from wind pressure, and in particular from variations in the pressure of the air on opposite sides of the house. Let us assume that a duct is led from a point close to the fire, under the floor and terminating in a grille in an external wall. If the wind is blowing in the direction of the inlet grille, the net result may be the introduction of a large volume of cold air into the room. If the wind is blowing in the opposite direction, the pocket of low-pressure air induced on the lee side of the house may produce the reverse effect and cause air to be extracted from the room.

The obvious answer to this difficulty is for the duct to run continuously from side to side of the house with inlet grilles located in opposite external walls. A tee branch from the main duct is then arranged to deliver air close to the fireplace. By this arrangement the varying effects of wind are balanced out and a steady air supply is ensured for the fire.

From the point of view of preserving flexibility in planning there is no doubt that such ducts are best out of the way and below floor level. The traditional suspended timber floor, of course, provides a ready-made void in which to run ducting, and in such floors the constructional difficulties are few. To-day, however, the suspended timber ground floor is rather out of favour and the solid concrete floor, which is the only practicable alternative, does offer difficulties when it comes to putting in ducts. Where there is no alternative to putting the fresh-

air duct below floor level a six-inch concrete or stoneware pipe can be laid just below the top of the concrete raft.

While the planning advantages of keeping the duct work below floor level will readily be appreciated there are several points deserving careful attention. First the construction of the foundation slab is made more complicated. This may not always matter, but in a large proportion of prefabricated houses the foundation slabs are sub-contracted and there is every advantage in keeping them as simple and straightforward as possible and concentrating all the more complicated items of construction in the superstructure. Second, difficulties may arise in arranging inlet grilles to the under-floor duct so that they are clear of the ground. Third, the possibility exists of water finding its way into the duct, and finally there is a risk of ducts becoming choked with rubbish during construction.

It will be seen that from the point of view of construction there are sound reasons for keeping ducts above the concrete level. It is not easy to keep such ducts unobtrusive. A boxed out skirting is a possible expedient but it is always an awkward projection in a room. A better solution perhaps is to run a duct of flat cross section in the thickness of a projecting dado. There is one other possibility which may be worth mentioning, and that is running the duct in the inter-floor space at first floor level, and having a tee branch extending downwards to deliver near the fireplace opening.

The exact positioning of the grille at the delivery end of the duct—that is, near the fireplace opening—requires some consideration. Horizontal grilles in the hearth itself should not be used as they allow dust and ashes to be swept into the duct. If a built-in kerb forms part of the hearth the grille can sometimes be arranged in the vertical face of the kerb towards the appliance. This brings the air in at the right place but the construction around the hearth is apt to get rather involved. An alternative position and one simpler in construction is in the surround itself at the side of the appliance, and kept down fairly low.

New Methods of Flue Construction

One of the features associated with many contemporary domestic heating installations is the free standing flue—generally of cast iron but it may also be of solid drawn steel, precast aluminous cement concrete pipes, glazed stoneware pipes or asbestos-aluminous cement pipes if and when they are commercially available. It may be mentioned that glazed stoneware pipes have the disadvantage that owing to their smoothness internally they favour sudden and possibly dangerous falls of soot. The flue pipe should have an internal diameter of 8 in., notwithstanding the fact that the appliance which it serves has a flue outlet of less diameter.

Among the factors that have contributed to this type of flue are, first, the prevailing shortage of traditional material ; second, the search for dry methods of building, especially in connection with factory-made houses and, third, the possibility of extracting waste heat from the flue by allowing a stream of air to come into contact with the hot flue pipe. Flues of this type must, of course, be adequately shrouded. The shrouding frequently—as in the M.O.W. heat service unit—constitutes the vertical duct supplying warm air to the upper floor.

Most bye-laws require that timber shall be kept a minimum distance of 9 in. from the inside of the flue. Adherence to this requirement results in a rather bulky shrouding and there are reasons for thinking the distance of 9 in. can be safely reduced. The M.O.W. unit, for example, is often installed so that the flue pipe is considerably closer to the surrounding timber than the statutory 9 in. This is again a case for a clear official ruling, and the anticipated recommendations of the Code of Practice Committee on flues will be awaited with considerable interest.

The support of the flue pipe will frequently call for a certain amount of constructional ingenuity. It is necessary to support the flue so that there is no possibility of its weight being transferred on to the heating appliance and at the same time to allow freedom for thermal expansion. It is particularly important to ensure that the flue pipe has completely air-tight joints and there should be adequate supervision on the job to see that jointing is properly carried out. If this is not done there is a risk of smoke leaking into the house when the fire is lit, and later, when the flue is warmed up, of warm air being drawn into the flue through the defective joints.

Access to the flue pipe must be provided, since it may be necessary within the life of the house to replace the flue pipe.

Chimney Terminals

One of the biggest headaches for the architect who uses cast iron or other flue pipes is what to do when the pipe emerges above the line of the roof. This is entirely an architectural problem, and if we could reconcile ourselves to a naked little pipe poking out through the roof there would be no need to worry any further. A really satisfactory chimney terminal has yet to be designed. The function of such a terminal, which is in effect a shrouding to that part of the flue pipe above the roof, is to protect the flue pipe against corrosion from the weather and to provide a satisfactory weather-tight and smoke-tight seal between the flue pipe and the roof covering.

One design for a thoroughly orthodox brick chimney stack balanced on top of a light steel framework hidden in the roof space has been produced, but I think that better solutions will be found by avoiding such obvious shams. The brick chimney is the natural extension of the brick fireplace and stack, but if we dispense with solid brick inside the house we should surely dispense with it outside. The solution must, I think, be along the lines of a terminal unit that embodies the same lightness and absence of mass as the rest of the construction. Such a unit would be light enough to be carried on the roof structure without any additional support from below. Several materials in addition to the ubiquitous asbestos cement have been suggested—notably light precast concrete, glazed stoneware and even heavy gauge copper—the latter, incidentally, in connection with a sheet copper roof.

Heating as a Primary Factor in the Evolution of the House

Before closing I want to stress again the critical influence which heating technique has had and will have on the development of the house. Even in the period since 1920 changes in heating practice—in particular the almost universal adoption of gas or electricity for cooking—have produced conspicuous changes in small house plans.

Of the innovations to which I have referred by far the most significant for domestic buildings is the introduction of warm-air heating. At present warm air is no more than a supplementary means of heating, but its use may well be greatly extended. It is clearly impossible to predict with any certainty repercussions of such a change in architectural design. In America, where warm-air heating for houses is a long-established practice, the more open domestic plan is largely attributable to the use of forced warm air. So far as this country is concerned it is safe, at any rate, to say that the wider adoption of warm-air heating, by creating a comfortable climate throughout the whole house, will increase the usable area of the plan. It may lead us, as it has the Americans, to the adoption of a more open type of plan. In this direction lie the most interesting developments architecturally.

Finally I would underline two essential preconditions for the successful adoption of these new ideas in heating. First is the need for more information on the technicalities of the problems involved. I mean particularly information which is intelligible to and usable by the building industry. Architects are already much indebted to scientists, but if we are not to progress by the painful process of trial and error there are a lot more urgent questions we want answered. Second, and last of all ; if the new heating standards are to be adopted and put into practice in every house there must be a widespread appreciation of the desirability and practicability of these standards. Selling the idea is clearly the Government's job, but architects by the nature of their work are in a position to help raise the low heating standards current to-day. I hope that some of the things I have said may stimulate architects to interest themselves in this task.

SUMMING UP OF SECTION II.

A. Parker, C.B.E., D.Sc., Director of Fuel Research, said: It is my task in the limited time at my disposal to review the position, taking into account all types of fuels, appliances and systems, with the object of directing the attention of architects and others concerned with housing to some of the principal factors to be considered in planning and equipping the house or dwelling so that as the centre of family life it provides the comfort and amenities desirable at reasonable overall cost.

As a starting point, let us consider what was the position in Great Britain during the inter-war years 1919 to 1939. It was then common practice to aim at certain minimum standards for number and type of rooms, floor area, and cubic capacity, which should be provided for the family of average size. But insufficient attention was given to the provision of heating services which would be adequate, efficient in the use of fuel, and economical in overall cost, and the possibilities of insulating the building to avoid any unnecessary large loss of heat to the surrounding atmosphere were almost entirely neglected.

Houses and flats cannot properly be planned and equipped to serve the many needs of the family unless the provision of heating and other services is fully considered at the outset. In the past, the usual procedure has been to plan the house, provide a few flues and chimneys, and think about the heating services afterwards as a kind of accessory. Costs must clearly be taken into account, but overall costs, including capital, maintenance and repairs, and operation, are not merely first cost. Hitherto many items of heating equipment have been chosen because their initial cost has been low. Often this has led to very inefficient use of fuel with high fuel costs and unsatisfactory service.

Domestic Fuel Consumption

What quantities of the different fuels are ordinarily used in Great Britain and what services are obtained from them? Since 1939 conditions have been abnormal. For this reason, it is best to take as a basis the figures for fuel consumption for the three complete years 1936 to 1938. During this period the total amount of coal used within this country, that is excluding coal exported and used for ships' bunkers, for all industrial and domestic purposes was about 180 million tons per annum. Of this total home consumption, 50 million tons of coal and anthracite (including miners' coal) were supplied direct to domestic consumers. In addition, large quantities of the gas and coke made at gasworks and coke ovens, and considerable amounts of electricity were supplied for domestic purposes. From the estimates that have been made, it seems that to the 50 million tons of coal and anthracite supplied as such, there should be added at least 10 million tons to allow for the coal used in producing the fuel or energy supplied in the form of gas, coke and electricity, making a total annual consumption, direct and indirect, of roughly 60 million tons of coal for domestic heating services. This is one-third of the total home consumption of coal, and it means that domestic consumers must have spent at least £150 million a year on fuel during 1936 to 1938. The same amount of fuel at the present time, if it were available, would cost domestic consumers about £250 million a year—an amount obviously of sufficient importance to justify real thought in planning houses and their heating services.

Efficiency of Use of Fuel before the War

What did the householders of Great Britain get from the consumption of this 60 million tons of coal a year? Before the war there were between 12 million and 13 million dwellings for a population of 46 million. This means an average of nearly 5 tons of coal per annum for each household, or nearly 1½ tons per person per year. If the coal could have been used with 100 per cent. efficiency, there would have been available an average for each dwelling of about 1,500 therms of heat a year. From the data available for other countries it has been estimated that the corresponding figure for the U.S.A. was 1,700 therms and for Germany 880 therms. Houses in the U.S.A. are kept warmer and more uniformly heated than in this country, and in general there are longer periods of colder weather. In spite of these differences, the amount of fuel used in relation to the number of dwellings and the size of population was not much greater than here. In Germany before the war, the houses were, in general, kept at least as warm as in Great Britain, but the relative fuel consumption was much lower though the climate is colder. Many factors accounted for these differences, but the main factors were more efficient appliances used in the U.S.A. and Germany, as in certain other countries, and the greater attention given to the construction of houses to prevent excessive loss of heat to the outside air.

It is not possible from available data to give accurate figures for the efficiency of utilisation of coal for the various domestic services under average household conditions in this country before the war. To obtain accurate figures would involve an enormous number of measurements in a large number of occupied dwellings with varied family requirements, and over long periods to cover different weather conditions. It is less difficult to determine the efficiency of appliances for space heating and the provision of hot water under test-bench conditions in the laboratory. But under such conditions the rate of supply of fuel and other factors are under constant scientific supervision and control, which are impracticable under ordinary conditions. Further, accurate allowance cannot be made for the fact that the appliances in ordinary use during many parts of the day or year, particularly with our variable climate, may be providing more radiant heat or convected heat or more hot water than is required, and to that extent the fuel is wasted. The rough estimates of fuel efficiency under everyday working conditions that can be made, however, do serve as a useful guide.

In Great Britain the usual appliances have been the traditional open fire for space heating and the kitchen range with an open fire for space heating and cooking, and often also for the provision of hot water, with the addition of a gas or electric cooker. The overall efficiency of the open coal fire under average household conditions has probably been less than 20 per cent. For the general purpose appliance in which coal is used for space heating, hot water, and cooking, the corresponding figure is somewhat greater, because of the heat taken up by the water. But it can be taken that the overall efficiency in use of the 50 million tons of raw coal for domestic purposes has not been more than about 20 per cent.; in other words only about one-fifth of the heat value of the coal has been usefully employed.

With coke for the open domestic fire with a grate designed for burning this fuel, the efficiency under average conditions is roughly 25 per cent., on the basis of the calorific value of the coke. In making coke and gas at gasworks and coke ovens, heat is expended in carbonising the coal from which they are derived. The efficiency of the carbonisation process is about 75 per cent. When related back to the original coal, therefore, the overall or coal economy efficiency in using coke in the open fire is no more than about 20 per cent. It is somewhat greater if the coke fire also provides hot water. In closed stoves and boilers of the domestic type, the efficiency of using coke is in the region of 40 to 50 per cent., equivalent to a coal economy efficiency of 35 to 40 per cent.

The efficiency of gas appliances in general is higher than that of the appliances using coal and coke. Modern pre-war gas fires have an efficiency of 40 to 50 per cent. under average conditions, or a coal economy efficiency of 30 to 40 per cent. Electrical appliances for space heating and for providing hot water are highly efficient in the use of the electrical energy supplied to them and have an overall efficiency in the region of 80 to 100 per cent., but the average efficiency of generation and distribution of electricity is low, only about 20 per cent. This means that the coal economy efficiency in using electricity for domestic heating is only in the region of 15 to 20 per cent. It should be stressed, however, that all these figures refer to conditions of use over long periods of many hours each day. For short periods of only a few hours the average efficiencies of appliances burning coal and coke are not so great as for long periods, with the result that for short-period intermittent heating, gas and electrical appliances may be more efficient and no more costly than solid fuel, and they have the advantages of greater efficiency and cleanliness.

Atmospheric Pollution

In addition to the great waste of coal that has occurred with the methods of domestic heating generally adopted in this country, there has resulted gross pollution of the atmosphere. The smoke emitted from the 50 million tons of coal annually burnt in domestic appliances before the war carried into the atmosphere more than one million tons of tarry and sooty matter. The effects of pollution of this kind include detriment to health, damage to agriculture, and damage to structure and materials, involving extra labour of cleaning and consequent waste of fuel, in addition to the direct waste represented by unburnt carbonaceous matter in the smoke. It is impossible to give an accurate figure for the cost of atmospheric pollution from the burning of raw coal in domestic appliances, but from the estimates that have been made it is certain that the money equivalent of the damage to buildings and materials and agriculture, together with the direct waste of fuel, is many millions of pounds per year. Considerable expenditure would be justified in reducing or preventing pollution of the atmosphere.

Improvements in Domestic Heating

During recent years, as explained by previous speakers, more efficient heating appliances have been developed for use in individual houses in this country. There have been improvements not only in gas and electrical space heaters, water heaters, and cookers, but also in appliances using solid fuel to provide similar services. For example, there have been developed and placed on the market, closed stoves which are highly efficient for space heating and water heating, and several cookers of the heat-storage type. These appliances have the advantage not only of high efficiency, at least twice as efficient as open coal fires, but they can be kept burning continuously overnight at low rates of consumption. In addition they do not draw into the house excessive quantities of cold air which carry away heat up the chimney and cause cold draughts. Some of the stoves are suitable for the circulation of hot water through radiators to provide full central heating or to give partial background heating. In general they require smokeless solid fuels such as anthracite, low volatile steam coal, or coke of a suitable grade of size. These fuels have the advantage of not producing smoke, but the quantities of smokeless solid fuels so far available would be insufficient if all houses were fully equipped with stoves of these types.

There is one difficulty to be overcome, even if the necessary smokeless fuels become available, before closed stoves will be adopted generally in this country. We are accustomed to the open fire, burning coal, with its ever-changing flames and cheerful appearance, and it is not easy to persuade householders to dispense with open fires and replace them by closed stoves. Recently, with the object of overcoming this difficulty, there have been designed open fires which burn coal with a production of less smoke than from open fires of the older type. Some of these new designs can be closed by a cover to allow for slow continuous burning during the night or at other times as required. There can also be provision for heating water and for heating air which can be carried by ducts into the same room or into other rooms. With provision for water heating and convection heating by warm air, especially if this air and some of the air for burning the coal is drawn directly from outside instead of through the room, these new fires are much more efficient than the traditional open coal fire. It should be pointed out, however, that no small domestic appliance suitable for an individual house has yet been designed which will burn bituminous coal without producing an appreciable quantity of smoke.

Another recent development is the openable stove so designed that doors at the front can be opened to give the appearance of the open fire or closed to serve more as a closed stove. Some of these stoves include a boiler for hot water and arrangements for warming air for circulation into the same room or other rooms. The boiler can also be used to circulate hot water through radiators. With these stoves, it is, in general, preferable to use graded smokeless fuel rather than bituminous coal. There are also designs which provide for cooking, water heating and space heating. These latest appliances of the several types for solid fuel are at least twice as efficient in the use of fuel under ordinary household conditions as the older appliances with open coal fires.

On grounds of cost, the main load for space heating and water heating in the winter in the majority of houses in this country will be carried by appliances burning solid fuel, with gas or electricity for much of the cooking load, some of the water heating load, and for short-period intermittent space heating, particularly in the milder weather. The relative division between solid fuel, gas and electricity will be dependent partly on local custom and preferences, and partly on the relative prices of solid fuel, gas and electricity.

Improvements are also being made in domestic appliances using oil fuels. The amount of oil likely to be used in domestic appliances, however, is likely to remain very small in relation to the quantity of coal used direct or indirect as coke, gas and electricity.

Insulation

Even if the individual fuel-burning appliance uses the fuel with high efficiency, the heating installation as a whole cannot give maximum working efficiency if insufficient attention is given to the possibilities of preventing dissipation of heat, where it is not required or is undesirable, by the judicious application of insulating material. Hot water pipes should obviously be insulated and hot water tanks should always be lagged. Often the appliances themselves, particularly cookers, require effective lagging to prevent wasteful dissipation of heat. The position and extent of lagging must be properly planned in relation to the heating unit and the house.

Ventilation

From the health standpoint, there should be adequate ventilation of all parts of the house; but in most cases in the past the ventilation has been excessive, with consequent great waste of heat and much discomfort from draughts. Often doors and windows have been badly made and fitted and many open fires and flues have been such that when the fire is burning in very cold weather, it has drawn vast quantities of cold air from outside through the house to be heated and carried away up the chimney. In many instances the quantity of cold air drawn in this way has been such that the heating effect of radiation from the fire has in large measure been offset by the cooling effect of the extra quantities of cold air from outside. With the best type of closed stoves and openable stoves, there is adequate but not excessive ventilation, and this draught-producing effect of the usual type of open fire is avoided.

Standards of Heating

The heating and ventilation of buildings has been considered in some detail by the Heating and Ventilation (Reconstruction) Committee of the Building Research Board of the Department of Scientific and Industrial Research. In its published report, the Committee has recommended standards of heating and facilities for hot water supplies and for cooking which are higher than have been practicable hitherto in the vast majority of houses. It is believed that these higher standards can be reached, or at least approached, at reasonable overall cost with new houses, provided that the houses are suitably designed and constructed and equipped with the most effective heating installations. Another condition is that there must be available fuels suitable for the selected appliances. With the object of keeping down capital costs, heating units are now being developed which can be made by mass production methods and form part of the house construction. With better insulation of houses and more efficient heating installations, the capital cost may be somewhat greater, but the average pre-war standard of heating could be obtained with a lower consumption of fuel or a much higher standard could be obtained with the same consumption of fuel.

If for a time it is necessary to install some open fires, they should be so designed as to be suitable for burning smokeless fuel such as coke, and not suitable only for bituminous coal. A change-over to solid smokeless fuel could then easily be made when the necessary supplies of such fuels become available.

In one session, it is obviously impossible to deal with this important subject of domestic heating and domestic heating appliances in detail. The main object has been to draw attention to the defects of the past and to show in what direction it is practicable to increase the comfort of our houses, and at the same time use fuel much more efficiently and with less pollution of the atmosphere. Attention has been drawn to the new appliances and systems that are becoming available.

Further developments and improvements are to be expected. At the present time investigations and developments are being undertaken, not only by the Fuel Research and Building Research establishments of the Department of Scientific and Industrial Research, but also by Industrial Research Associations and by many industrial firms. All these research units are working in the closest co-operation, and there is no doubt that as these investigations are continued and intensified, the results will be applied and further improvements will be effected in the heating and ventilation of our houses.

DISCUSSION

Mr. A. L. Roberts [*F.*], Hon. Secretary the R.I.B.A., said he had had over 45 years' experience as an official architect. Having regard to that experience and to his contact with architects in private practice, he thought he could speak for the whole of the profession in assuring the Conference that architects were very conscious of the defects in the appliances which were available to them in the past and that they were examining with keen interest the developments which were now taking place in order to meet the Government's difficulties and with a view to increasing the efficiency of services in the home.

Architects prided themselves on their adaptability in planning to meet all requirements; that, after all, was their job. It should be realised, however, that the architect worked for clients, if he were in private practice, and for a committee if he were in the local government service, and that both clients and committees had a very awkward habit of asking questions which the architect was expected to answer! It would be appreciated, therefore, that when an architect put forward a scheme he had to be prepared to deal with its snags as well as with its advantages. It was significant, he thought, that Mr. Pinckheard was the only speaker who had mentioned a snag in connection with one of the new appliances. It was only by looking at the matter from that point of view that the architect could safeguard himself. The architectural profession gratefully acknowledged the assistance it was now getting from the scientists (indeed it could not do without it), but the scientists' theories had to stand the acid test of use and practice, and there was, as everyone knew, frequently a great difference between theory and practice. In that connection the question of capital cost could not be disregarded.

Turning to the use of warm air ducts, he appealed to the scientists and to those who were developing the idea to ensure that the parts of the flues in which the air flowed were accessible for cleaning purposes. Air, unfortunately, took other things with it, and those who had experience of air ducts knew how filthy they became.

Mr. Pinckheard had suggested that the intake might be from the hall. In small houses, however, it was probably the door from the kitchen to the hall which would be open when cooking or washing was in progress, and the steam generated in the kitchen would probably ascend to the bedrooms, possibly to such an extent as to cause mildew.

It was useless to put things in the home which depended too much on the human element, and it was not an economic arrangement to install appliances which could not be used because the tenant could not afford to use them. A little sociology was involved in the problem and should not be overlooked.

Mr. Knapp said he had recently been told by the representative of a manufacturing firm that the plugs for use in connection with ring mains were the subject of a patent in which that firm held all the rights. He asked whether that was so. If it was, it precluded their use generally for housing because of the difficulty of maintenance and replacement.

Mr. J. I. Bernard replied that whilst certain patented designs of plugs had been produced by individual manufacturers, the position generally was that a British Standards specification was about to be issued and the plug would be made by all manufacturers.

Mr. Robson said he understood Mr. Pinckheard to say that it was practicable to bring in a duct at first-floor level, down to the convection chamber and up to the other points. He had been taught that a draught increased or decreased between the inlet and the outlet, and that if the inlet were raised the current of air was slowed.

Mr. J. Pinckheard replied that he could not give a definite answer because he did not know of any such duct having been installed. The question arose because—as he had tried to make clear in his paper—it was sometimes very difficult to bring in a duct at ground-floor level. If the duct were brought in at first-floor level, with a downward pointing "T," it was possible that there would be a sufficiently strong pull on the flue to draw air from the inlet duct, located in front of the fireplace opening, in the surround or wherever it was put. He agreed that if the downward leg of the duct became sufficiently hot (if it were put tight up against the flue, for example) conditions might easily obtain which would be the reverse of those desired, but provided that could be obviated, possibly by insulating the downward branch against the heat of the stack, there seemed to be a good possibility that the pull of the flue would pull air in from the open grating.

Mr. Hooper said there were a number of people who had cost of works houses in London which were now flat. He asked the Government officials present to urge the War Damage Commission to allow the rebuilding of cost of works houses incorporating the excellent systems which were now going into the houses built under the State housing scheme.

The Chairman answered that he was quite sure, so far as his Minister was concerned, that he would be most anxious, provided the apparatus were available, to encourage the War Damage Commission to permit that. It had been clearly indicated in the speeches yesterday that the problem was not only one of installing new apparatus, where it would effect a saving in fuel, in new houses but also in reconstructed houses.

Mr. Mayson enquired as to the possibility of discoloration taking place round the outlets of hot air ducts. He had seen instances of heating columns attracting dirt to their surfaces and to surrounding surfaces, and it was his impression that there was a grave risk of discoloration taking place round the mouth of the outlet in a room.

Mr. J. Pinckheard said there were two sorts of discoloration to watch for around outlet grilles. First of all, there was the possibility of air coming out between the grille and the plaster face, thus causing localised black marks, and secondly, there was the question of a general darkening of the wall over the opening.

The first difficulty could be overcome by the provision of a proper gasket between the grille and the plaster face, making an air-tight joint and thus avoiding localised staining. The problem of the general darkening might be met to some extent by designing the louvres in such a way as to throw the air outwards into the room. The velocity of the air from the duct, however, was, relatively, so low that even the provision of louvres to deflect it outwards might not prevent it from turning back and crawling up the wall. If the air were moving at a high velocity, that device might be effective, but it was not possible to give a positive assurance, with the grilles available at the moment, that there would not be a general staining above them.

Mr. Foster pointed out that there had been no mention of radiators. Much had been said about ducts, but ducts were a headache in a small house and a worse one in flats. At the moment it might be better, instead of spending money on ducts, to install two radiators worked from a boiler behind an open

fire. The open fire, he understood, would be sufficient for two radiators and a hot water system. That would help to solve one of the housewife's problems, i.e., airing; she could not air on the outlet from a hot air duct but she could on a radiator.

Mr. J. S. Hales said the suggestion was a good one in that it was an alternative where the boiler capacity was adequate for the purpose. There were quite a number of difficulties in a hot air system, and in some circumstances the radiator had its points and could certainly be used as a substitute.

Dr. Parker said that Mr. Roberts had spoken about warm air ducts and the danger of their absorbing dust and odours from the rest of the house. The authors realised—and had done for some time—that there were problems connected with the use of those ducts and agreed that those points required to be watched carefully.

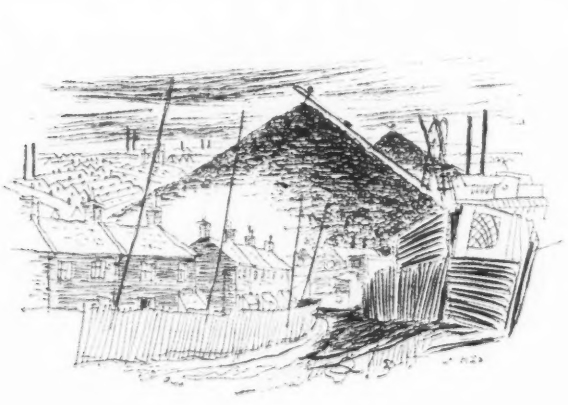
Mr. Roberts had also raised the point of the calorific value of the coal—quality coming into the picture. His own remarks about efficiency were, of course, related to the calorific value of the coal—how much heat could be obtained from a fuel delivered at 100 per cent. efficiency and what could be obtained from these appliances. Everyone knew that the quality of coal had declined in the last few years, but, even after making allowance for that, the difference probably amounted to no more than 5 per cent., and if the overall estimate of the cost of heating in any individual house was accurate to within 5 per cent., that was doing extraordinarily well. It could be assumed, he thought, that the estimates on that basis were nearly enough accurate.

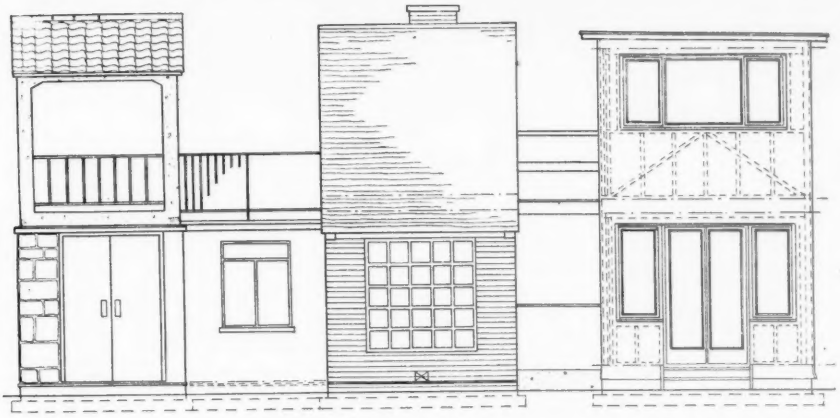
Mr. Roberts had also made the point that tenants should not be provided with appliances which depended too much on the human element, which meant, he supposed, appliances needing an enormous amount of regulation and requiring almost a trained scientist to operate them. The Conference, however, could rest assured that those at the Fuel Research Station who had the task of testing new appliances had that point very much in mind. As a scientist, he would have no difficulty in designing an appliance with a working efficiency of something like 70 to 75 per cent., but it might have half a dozen dampers and half a dozen screws for regulation. When he got home at night he would not want to be bothered with an appliance like that, and neither would the ordinary householder. The Fuel Research Station also watched the flexibility of appliances. It was all very well to install a multi-purpose appliance which could be used for space heating, water heating, cooking and so on, but it was not much use if, just because the user wanted a certain amount of space heating, he had at the same time to provide so much hot water that he had to run it off frequently to stop it boiling. All that was taken into account. The Research Station aimed at guiding manufacturers, when they needed guidance, towards flexibility and simplicity, and he was prepared to sacrifice a certain amount of test bench efficiency to get what he called better working efficiency. At the Research Station appliances were tested under all sorts of practical conditions for a long time.

Dealing with the question of whether tenants could afford appliances, he said the aim was to encourage those appliances which were flexible in use and which worked at higher efficiencies. It was admitted that in most cases the capital cost would be rather higher, but the running costs would be such that the pre-war degree of comfort could be obtained at a lower cost in the matter of fuel, or, if the tenants could afford it, more comfort could be provided at no greater cost. The change in the value of money, of course, had to be taken into account, but that was allowed for in wages. We could not get coal at the same price as in pre-war days.

Solid fuel was bound to be the main means of heating in households for many years to come. It had the advantage that it took the peak load in winter and that adequate storage capacity could be provided for it. A reserve of solid fuel could be built up, but that could not be done in the case of the other fuels; the electricity companies could not store electricity at all and the gas companies could only store gas for about 24 hours. They had to bring in stand-by equipment to meet peak loads. Solid fuel, by carrying the heavy winter load, kept down the cost of gas and electricity, because if those undertakings had to carry an enormous amount of stand-by plant which could not be operated in the summer the overall costs of gas and electricity would rise.

The report of the Conference will be concluded in the December JOURNAL. *The whole report will be reprinted as a pamphlet. Copies obtainable on application to the Secretary R.I.B.A., 2s.6 d. post free.*



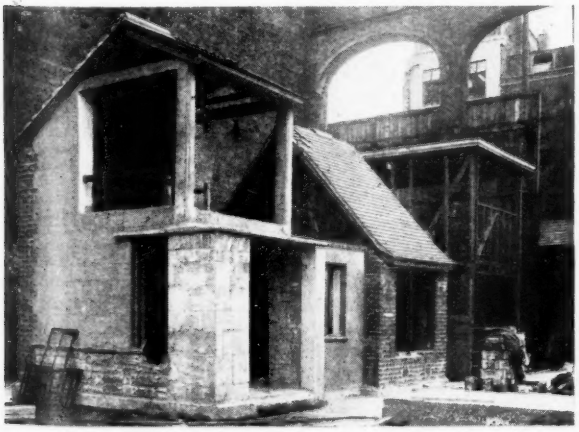


PRACTICAL TRAINING FOR STUDENTS

A New Development at the Architectural Association School of Architecture

During the latter two terms of the academic year just ended, students of the A.A. School built the structure illustrated in the drawing above and the photograph below as part of a newly introduced practical training scheme. Conjecture as to the possibility and advantage, if any, of including practical training in the school curriculum, especially at a time when materials were in very short supply, and when the number of students was rapidly increasing, was bound to arise. If there were sceptics, it was not altogether surprising. An architect's training inevitably covers a wide range of subjects, and the specialist teacher in each subject, not least the studio master, is very jealous of the time allotted to him. It might reasonably be argued that to embark on practical training, would rob him of valuable time and further complicate an already overburdened curriculum.

On the other hand, it has been recognised for some time now—and not least by students themselves—that whilst an academic system may present clearly the scope of the theoretical knowledge required, and therefore avoid the piecemeal assimilation which results when a student is articled to a practising architect, it does not bring the student sufficiently in touch with actual building operations and their attendant problems. It is notable that this point was stressed in the recently published R.I.B.A. report on Architectural Education.

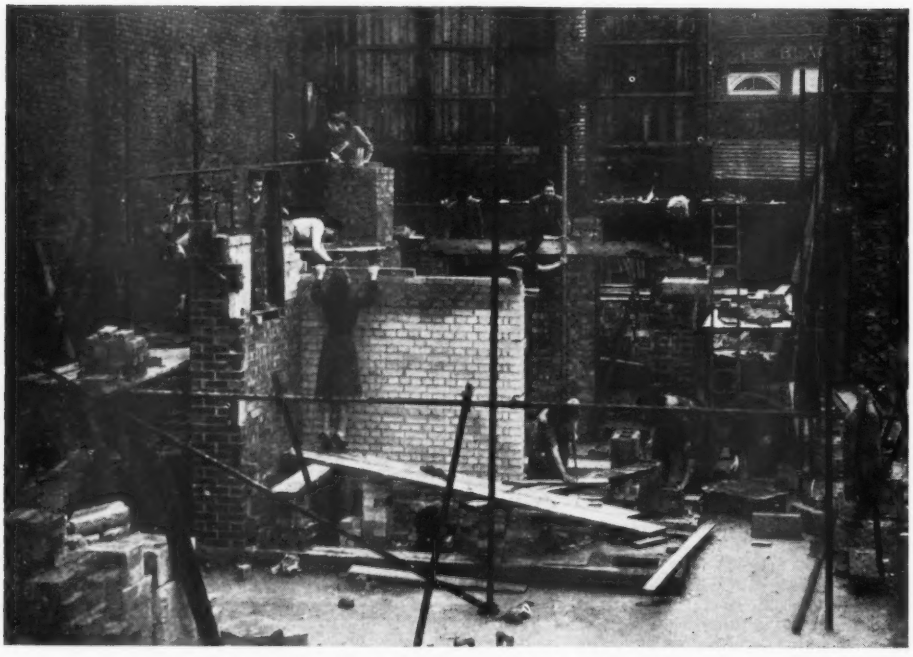


The composite building, at the end of the last school year.

It was felt that the proposed scheme would do much to overcome this serious shortcoming and in addition, have other valuable advantages. For instance, it seemed obvious that the student would better understand details of construction if he were to carry them out in practice and he would be likely to take a keener and more critical interest throughout his course in such materials as he might handle on the site. The practical work would supplement the lectures and help to give, perhaps, a more realistic approach to studio problems.

Having then decided that the scheme was worth-while, and having designed a building in which the sequence of operations would fit in with the lecture timetable, it remained only to find a site and to obtain the necessary materials. Fortunately there was a bombed area immediately at the back of the School in Morwell Street which the A.A. was able to acquire temporarily, so that the question of finding a site was conveniently solved. As regards materials, it may be said that the scheme was made possible only by the co-operation of the building trade through the medium of various trade associations, and through individual firms, who generously gave their services either by supplying materials, or arranging to give demonstrations, or both.

No doubt many readers will be questioning the appearance of the building. What should be made clear is that it is not, of course, a real building at all, but a composite structure designed to give exercise in as many building processes as possible. It has been suggested that it would be more useful if work were done on an actual building of which subsequent use would be made, but it is not difficult to see that it would be almost impossible to obtain the same range of experience if this were done, or indeed to fit a satisfactory programme into the time available, especially if any attempt were made to co-ordinate the practical work with the lecture course ; moreover, since there is clearly no suggestion of trying to turn the student into a tradesman, one of the important problems in organisation is to give only sufficient time to each trade for him to benefit from it as a prospective architect, and yet at the same time, to have done, for instance, sufficient brickwork to give wall space for plastering, and to end up with a building whose component parts have a reasonable sense of scale. It might be as well to point out here that the scheme does not take the place of visits to work in progress or of office experience.



A group of students at work on the present composite building.

The original programme devised by Mr. H. P. Crallan, M.A. [*A.*], was so arranged that the building should be complete by the end of one year. Within this time the first year students were to carry out brickwork, carpentry and timber framing, and joinery; part of each of the three terms being devoted to these subjects respectively. Similarly, the second year students were to deal with masonry and block laying, roof covering and painting and decorating, whilst the third year students were to be concerned with reinforced concrete, asphalting, floor and wall tiling, drainage and services, and rendering and plastering. Correlated with the particular work in hand, and as a supplement to the experience gained on the site, visits were made to yards, workshops and factories so that at least a casual acquaintance might be established with the manufacturing processes.

Specialist work, such as asphalting, machine-applied rendering, laying of terrazzo flooring, and so on, cannot reasonably be expected of the student, and it is doubtful whether, in fact, he would gain much advantage from trying to do this type of work. Instead, demonstrations were arranged, during which a specialist was invited to speak about the work which he was actually carrying out on the site. These demonstrations proved very successful and gave an opportunity to the specialist to voice his requirements of, and perhaps his grievances against, the architect.

Due mainly to a late start and to the vagaries of the weather, the scheme was not completed last year. It is now proposed to cover in the site so as to circumvent the climate, but it is perhaps unfortunate that the student will be deprived of the anxieties which every architect is forced to suffer on account of the weather.

Nevertheless, despite the initial delays and the weather, it proved possible even in difficult circumstances, to include this additional part of the student's training in the curriculum, and very largely to correlate the practical work with the lecture course. Those who took part will have handled bricks and mortar, mixed concrete, laid tiles and so on, and after a three-year cycle a student will, himself or herself, have performed or closely supervised most of the basic operations of normal building construction, including the fitting of elementary services. He or she will also have had the benefit of the help and advice of an instructor who is a craftsman.

There is no doubt that, other advantages apart, the scheme is of great value in teaching the student to appreciate some of the craftsman's difficulties and therefore to impress on him the need to consider design in relation to actual building operations and their sequence; also in teaching him to understand the necessity for giving exact and clear instructions, especially by way of detail drawings, and having given them to ensure by close supervision that they are carried out.

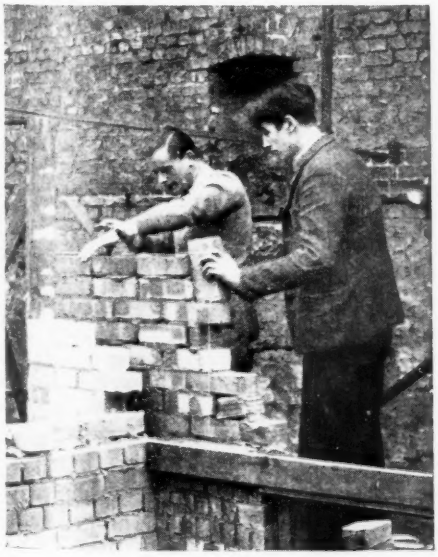
This year, the same basic design will be used again, but with certain modifications in the range of materials used: for instance, a greater variety of brick will be used, and some cored foamed slag blocks will be included in the masonry programme. A number of details such as the use of sheet zinc for cills and concrete and metal subframes for windows, will also be demonstrated.

These alterations and additions are, like the other items in the scheme, included with the express purpose of demonstrating particular aspects of construction and not merely for their own sake. Electric wiring is to be added, and a sample of climbing scaffold will be available for use alongside the traditional scaffold to illustrate the trend towards mechanisation in the industry. The school is indeed fortunate in having a promise of some of these scaffold jacks, which are only now coming off the production lines for their first appearance in the industry.

It has become almost a habit to accuse architects of being unpractical. Perhaps this scheme launched by the A.A. will, by its mere existence, confound the more irresponsible accusers; and it may be hoped that those who in the past have had a justifiable grievance against the profession on this account will have less cause in the future to support that grievance.

J. Eastwick Field, B.A.Arch. (Lond.) [*A.*],
Organiser, Practical Training.

Students at work on the 1946-47 building. The photographs show building a chimney stack, plumbing a quoin block, building a wall of foamed slag blocks, "knocking up" mortar and building a cavity wall.



TECHNICAL INVESTIGATIONS IN GERMANY

A PAPER PRESENTED BY MR. M. HARTLAND THOMAS, M.A. [*F.*], AT A MEETING OF THE R.I.B.A. ARCHITECTURAL SCIENCE BOARD WEDNESDAY 9 OCTOBER, 1946.

THE PRESIDENT, Mr. L. H. KEAY, O.B.E., in the Chair

The President said that in the summer of 1945 the Royal Institute was approached by the Ministry of Works in connection with certain information from Germany which was being produced by the British Intelligence Objectives Sub-Committee. The Council had appointed Mr. Hartland Thomas to act as liaison officer with the Ministry. Eventually a team consisting of architects, civil engineers and contractors, went to Germany in October 1945, as assessors of the Ministry of Works, charged with the duty of investigating the German building and civil engineering industry, in order to see whether any information could be gleaned which would be useful to this country.

The Institute was fortunate in having Mr. Hartland Thomas and the other members of the team present that evening. Mr. Hartland Thomas would explain the principal findings of the team, which had been published in a Report* that could be purchased from H.M. Stationery Office.

Mr. Hartland Thomas. On behalf of the Architectural Science Board, I should like to thank the President for the honour he does us by taking the Chair at our first lecture this session.

On a rather more personal matter, I want to express my great pleasure at the reunion of our team that went to Germany. We were almost complete strangers to each other and we were sent to Germany to live together for two and three months under unusual conditions, which, as you can well imagine, put a strain on us. We do claim, however, to have operated as a team, and our report and its presentation to-night are team work. I am merely the spokesman, as I was in Germany when trying to negotiate tolerable billets or permission to purchase some of the luxuries in the American officers' shops or trying to get information out of not reluctant but over-keen German professors. Although I am the spokesman, I do not wish you to direct your attention to me exclusively. There are large portions of the report on which my knowledge is weak and the knowledge of my colleagues is stronger.

As the President has already explained to you, this report is on things we found in Germany that might be useful to us; it is not a general survey of the German building and civil engineering industry. We went to Germany with the best previous information that we could get. We then spent a considerable time in studying military records, trying to get a line on anything that seemed to be useful to the British building and civil engineering industries. Within the limits of our experience we tried to keep in mind the needs of the whole Empire rather than just the needs of these islands. We have produced a report listing subjects that we thought were interesting, and, if we have omitted things that seem at first glance to be important factors in the German building industry, the reason is either that we did not think that German practice had much to teach us in those respects or that previous investigators (ours was not the first investigation in Germany) had already covered the ground.

We are very anxious that you should not think that our report is in any way an advocacy of all things German. We approached in a very practical manner the question of using German material. If the German material is useful we recommend that you should study it.

We found no difficulty in extracting information. That was a matter which worried us before we went to Germany, but we found that the German experts were anxious to impart information. They wanted to make a good impression upon their new masters. There was one point on which one of our members felt that he was being put off, and I am not sure what his final view is on that, but that was the exception which only goes to reinforce what was the general rule.

It is odd that, since we have returned to this country, we have found that it has to a large extent devolved on us, whose original brief was merely investigation, to see that the information is used. That is one of our main reasons for presenting this report to you to-day. It has proved that, although we were sent to Germany to obtain this information and make recommendations for further studies, the organisation to promote those further studies rather waited upon our initiative in some ways (I do not want to overstress this) before it was set up.

We were in Germany from last October to January. We presented our preliminary report within a fortnight of our return, and I think I can fairly state that work on the implementation of that report began last January. The final report, on which we were working at the same time as the study of the documents which we brought back was proceeding, was presented this summer, and, as the President has mentioned, it can be bought at the Stationery Office.

Two or three days ago I had an interview at the Ministry of Works with Professor Webster, who is one of the three Deputy Chief Scientific Advisers at the Ministry. That interview, from the point of view of the using of our report, was very encouraging. I propose to go through the main headings of the report, which we call our Summary and Recommendations, and tell you the position, so far as I know it, in regard to the implementation of our recommendations, at the same time, of course, saying something about the recommendations themselves.

Our recommendations are divided into two lists. The subjects in the first list we call the "chief subjects," not from the point of view of their importance in the building industry but from the point of view of our interest in them, and then there are the secondary subjects, in which we do not feel that there is so much of interest. The order is, however, largely alphabetical.

First in our list of chief subjects are the autobahn bridges. The German motor roads—the autobahnen—are planned with a considerable number of overpass bridges carrying subsidiary roads clear of the main line. These bridges are of a considerable variety in design and construction but every bridge has very much the same job to do. Here is a full-scale field experiment in bridge design, and we recommended in our report that these bridges should be studied, particularly as now, owing to the conquest of Germany, we have possession of the German records of costs and designs, calculations and many other things that were not published before the war as a military precaution. There is now an investigation team on autobahn bridges in Germany now, composed of members of the Ministry of Transport and the Building Research Station, so I feel that our recommendation in that respect is being followed. The designing of bridges is perhaps not one of the things on which the members of this Institute are often employed, but the reasons for choosing particular types of bridge design are often similar to the reasons for choosing certain methods for spanning spaces for enclosure in buildings, and I do not feel that the subject of the designing of bridges is so far outside the range of this Institute as it might at first glance appear to be.

*B.I.O.S. 575. The German Building Industry. H.M.S.O. 12s. 6d. (12s. 8d. post free.)

The next subject with which we deal is autobahn planning. We felt that, in such a large-scale piece of public construction as the motor roads for a whole country the size of Germany, there must be, apart from questions of road construction, road surfacing, and so on, important town planning considerations to be taken into account. Even if they were not, we felt sure that the effects of the autobahn being slung across the country upon town planning considerations would have been recorded in various ways in Germany and would provide very illuminating information to our town planners in considering the effects of proposed motor roads in this country. A very important side line to that was the landscaping of the autobahn, which was supremely well done, and we brought home a large body of German literature on it. (I should say in parenthesis that the literature and documents to which I refer are deposited in the Ministry of Works library and can be consulted there, and the same applies to our photographs.) A hundred and fifty years ago we were particularly good at landscaping in this country, but we have rather lost the art in the last two generations. You all know the dreadful cuttings through a hillside that we do nowadays, with trees planted in straight lines which only emphasise the cut. The landscaping of the autobahn is the reverse of that and is worth studying. Our recommendation that the German records should be methodically searched for town planning information in connection with the autobahn, in order to find answers to specific British problems, has not yet, I feel, been properly understood. I believe that the Ministry of Transport has teams of investigators in Germany to study the autobahn, but from the constructional point of view, and I hope that a team will be sponsored by the Ministry of Town and Country Planning to carry out our recommendation.

The next subject is one of peculiar difficulty for me, because I know little or nothing about it, namely, the question of canals, river improvement and hydraulics. This is a subject in regard to which we must confess that our sampling was rather scantier than it was in connection with some of the other subjects. The opportunities of travel and contacts, made our work very uneven in the different fields, but we felt sufficiently convinced that there was interesting German work to recommend three investigations, one on canals, river regulation and training, and canalisation, the second on low-head hydro-electric barrages, and the third on hydraulics research establishments. I wish to emphasise that, in making these recommendations, we felt convinced that there was German work of interest to British engineers subsequent to 1939, and I am glad to say that I understand the Ministry of Works is recommending to the interested Departments that three teams should be collected and sent out to carry out our three recommendations. The recommendation that the German hydraulics research establishments should be investigated has particular point in view of the proposal that a new establishment for hydraulics research should be instituted under the Department of Scientific and Industrial Research.

The next subject in our list is dimensional standardisation, a subject which I think is of considerable interest to the R.I.B.A. Dimensional standardisation in this country and America has gone on very different lines from those on which it went in Germany during the war. We have been studying the reduction of dimensions to a standard module in three dimensions and a small one at that; in fact, studies seem to have progressively reduced the module down to 3 inches for brickwork in this country and 4 inches for timber in America, and there is a grave risk that the difficulties of fitting together the various components in these sizes may reduce the studies to the absurdity of our saying: "Let us have an inch as a module." We found that the Germans had avoided the impasse which the British study of dimensional standardisation has reached, by laying down a large standard planning grid. The grid which was laid down was a square grid of $2\frac{1}{2}$ metres for factories, which was reduced to $1\frac{1}{4}$ metres for war-time hutments and living accommodation. This was a war-time measure but it was a law that all war-time buildings must be planned on this grid unless a very good reason was shown why that should not be done. Although with the capitulation of Germany all Nazi regulations automatically became null and void, the Germans found this planning grid so useful that we encountered numerous examples of their still working to it. For example, when we asked a components manufacturer what his standard sizes were he would rattle out the standard sizes of the grid, and an architect working at rehousing at Cologne would design all his houses on the grid. That, we felt, was important evidence. The advantage of laying down a grid of this sort is that one does not have to trouble with the minutiæ of thicknesses of walls, sizes of cookers, sizes of window panes, and so forth. The Germans laid down the grid, people conformed to it, and the standard fitments of any maker of prefabricated materials had to come into phase, the due allowances being made. I should emphasise that it is only a planning grid and that no attempt was made to standardise heights. That, of course, is very important from our point of view as architects, because it leaves us entirely free to handle proportions of final buildings. I am going to propose later to the Architectural Science Board that we set up a study group on this subject.

We come next to lightweight concrete. This is a most important building material and is the subject of a considerable amount of study in this country and America. It is very highly regarded by the Building Research Station and the Ministry of Works for its possibilities, particularly in regard to our housing programme. We were able to bring back from Germany a fair amount of evidence and literature on the subject, also lists of what we call targets, i.e., German individuals and firms that should be contacted, but we had been preceded by a specialist team that had studied this matter, so we did not feel that we were pioneers in connection with it. We felt that it was already known in this country that the Germans had information on lightweight concrete. By "lightweight" concrete I do not mean concrete made with a lightweight aggregate; I mean concrete expanded by some process of gasification so that it becomes cellular and thereby light. Concrete of the expanded or gasified type is very much lighter than the light aggregate type of concrete; I believe I am right in saying that the expanded type weighs about 50 lb. per cu. ft., the light aggregate concrete a little over 100 lb. per cu. ft., and ordinary concrete 150 lb. per cu. ft. I think we can feel confident that the subject of lightweight concrete is being very thoroughly handled at the Building Research Station. The fact that the specialist team to which I referred has not yet published its report is really a matter of little importance, because anyone who wants information on lightweight concrete can get it at the Building Research Station, which also has information on the subject from America and Sweden. The only point about contacting the Germans in this respect is that, they being somewhat under our control at the moment, we might be able to get commercial secrets out of them more easily than from the Swedes or the Americans.

The next subject is something very different, namely, payment by results. We found that the Germans, like ourselves, had found it necessary during the war to devise schemes for incentive pay. It appears that in this country the opinion is growing amongst all sections of industry that we need to consider rewards for better work than the average. We brought back from Germany full documentation of the German method of payment by results, which I need hardly tell you was many times more elaborate than ours, and the pages in our report which describe their method of payment by results seem fantastically complicated. The complication of the German system is interesting, because it seems to me that our war-time payment by results scheme failed owing to its being too simple. We heard many stories of the operative earning his bonus on foundation work, and then as work on the superstructure (I am referring to brickwork, quoins and setting window frames, etc.) was in our simple scheme impossible to bonus, he was able to take a rest. Moreover, a gang on superstructure work would be jealous of a gang on foundation work, and that is bad for morale. The German material is now being studied at the Ministry of Works and by the operatives' and employers' organisations in the

building industry. I am not for one moment suggesting that we should copy the German scheme, because I think some of it is of doubtful value, but it is very interesting to compare it with our own ideas.

I now come to the question of prestressed concrete. We thought that the information on this subject probably existed in this country to a very large extent and, of course, to a greater extent in France, owing to Freyssinet's work, but that the Germans had used prestressed concrete a good deal more and might have information on manufacturing and structural technique, rather than design, which would be useful to us. I had an idea that the Germans were trying hard to find an alternative to Freyssinet's method, so as not to cut across his patent, and that there might well be something which would be of value to us.

I think, however, that the subject of prestressed concrete is one of those structural engineering subjects in which we fail to use the information we have. In the structural engineering field the Germans tend to use new techniques much more than we do; it is not that they have any brilliant new techniques which are unknown to us but that they use those techniques. I think that we should try to persuade architects to ask for some of these things, just as my colleague Mr. John Mason tried the other day to persuade his fellow structural engineers to use some of them a little more. The Ministry of Works is studying our documentation on this subject but has not yet decided whether it would be advantageous to send a team of investigators to Germany on the subject of prestressed reinforced concrete.

The next subject is shell concrete, which is the thin vaulted reinforced concrete roofing which the curvature of the roof enables to stand like a beam over a length, which is shaped like an arch and looks like an arch, but does not operate structurally as an arch ; it is more like corrugated paper. Shell concrete was used to an enormous extent in German wartime factory construction. There were literally acres of shell concrete factory roofs of different kinds, the ordinary barrels and the half barrels giving a sort of north light roof. It was quite clear that the Germans found this to be an economical method of roofing wartime factories, and that they had studied the theory of shell concrete construction extensively. In our report we recommend that our documents should be studied and discussed with British experts in this field, and that any further investigations should be guided by that discussion. We were fortunate in being able to bring to this country a complete set of calculations and drawings for the People's Car Factory in shell concrete. That is the most important document that we brought home to study. I am not sure what people have made of the study of this document and the consideration of our position *vis-à-vis* shell concrete, but I have a very strong feeling that we still have something to learn from German engineers on the theory of shell concrete, and I believe that view is shared by the Ministry of Works. I therefore feel certain that the study of this subject is proceeding in the way it should. We learned that the famous Professor Dischinger, who is one of the leading experts on shell concrete, had been commissioned by the Russians to write a book finalising his views on the subject, and we do not see any reason why we should not have a copy of that book when it is published.

Now I come to steelwork. The high light in German steelwork, of course, as we knew before we went to Germany, is the German welding practice, and we recommend that two teams should go to Germany to investigate welded construction, one on the research side and the other on the designing and erection side of the subject. I understand from the Ministry of Works that there is one team in Germany at the present moment on the implementation of our report, giving further study to German welding. We were able to obtain some information on the failure of some of the German welded bridges, and you will find that subject discussed in our report. That aspect, which is an extremely involved technical study, is being followed with particular interest, and I think the picture of our investigations into welding falls into the following form. A team is in Germany now of a preparatory nature, doing the preliminary work in a re-survey of German welding, with a view to a future team going to Germany on the finer details of the subject. I do not think that is altogether surprising, because the subject is a most important and very large one, and I do not think we can feel that our sampling of it and recommendations on it really cover the preliminary work, which I think has to be done again. We also mention in our report that the Germans have done one or two rather interesting things in tubular work, chiefly in very neat detailing, and I understand that a team is going to Germany to study that.

Now we come to timber, which is the last of the subjects in regard to which we thought there was considerable interest in the German work. The Germans used timber construction for some of their wartime building in order to save steel. That seems very strange to us, of course, because timber was the most difficult thing for us to acquire during the war, and it is even more difficult to get now, but American industrial building went very much in that direction during the war, and a comparison between German experience and American experience is interesting. On the whole, we found that there was little that the Germans had done in timber engineering construction that the Americans had not done, perhaps better, with the exception of one particular aspect of extreme interest, namely, the German work on nailed timber structures. We were shown a substitute bridge at Heidelberg in which nailed timber plate girders were used in a way almost exactly analogous to the way in which riveted steel plate girders are used, taking very much the same forms. That bridge at Heidelberg was doing full duty as a road bridge, with trams, etc., going over it, and there were many other similar structures. I understand that the subject is going to be studied by a team specially to study nailed structures. One other item of interest seems like a detail, but it is a revolutionary one, that is, the German multiple V joint. The ends of the timbers were formed in a special machine to make the male and female parts of a multiple V, and that joint is of peculiar strength, because one does not get failure in shear just under the glue line. This particular detail is being pursued with vigour.

There are other points in connection with timber which I will not deal with here. They fall mainly under the heading of a comparison between German research work and ours, not from the point of view that the Germans have discovered anything very great, but simply for the sake of the comparison—to compare their stress grading, their drying methods, and so on, with ours.

Those are the main subjects of interest. On each of the items, which very largely go with our subjects, there is either in being or being set up a special study group at the Ministry of Works. The study and implementation of our report is being handled at a high level in the Department of the Chief Scientific Adviser. I am also very pleased to be able to report that, to facilitate matters still further, the Ministry of Works has sent to Germany and stationed in the Building Industries Branch of the Control Commission an official from the Chief Scientific Adviser's Department, to make a continuing contact between the research work in the Ministry of Works and the information that can be gleaned in Germany. That is most important, and I think that our team can claim some credit for facilitating that intercommunication. We made close contact with the officials in the Building Industries Division of the Control Commission in Germany and found them very willing to make their work in Germany march in parallel with research work in this country.

The other subjects in our report are as follows.

First, there is German architecture. I think you know as well as I do that the Nazis did not have a very fortunate effect on German architecture. We found, however, that the German industrial architecture, which did not receive so much attention from the Party, was able to produce quite a large body of good, straightforward, reasonable building, quite decently designed. If people and time could be spared it would be worth while documenting that, but I think it is quite clear that in these days we have not the skilled workers to spare for that sort of documentation, and I think we can safely leave the Building Industries Division of the Control Commission to collect this information as it comes to them and let us have it. We recommend in our report the publication of two pieces of work that we happened to come

across, namely, some work by Balser of Frankfurt on hospital planning and some very fine pithead baths on the most lavish scale, which were completed, I think, in 1942, long after we had cut down our building expenditure to a minimum. They were later completely destroyed by the R.A.F.

Next we have a rather interesting item which we have called the lattice retaining wall. I do not know whether there is an official English translation of the German word, which is *gitterwand*. This is a cleverly designed wall in which the thrust of the earth on to the back of the wall is taken by slabs inserted into the face of the earth and supported on the wall. In that way thrust on the wall is avoided and one can build the wall very much lighter or even as an open framework. This minor item is promoting interest. It is a detail that might quite well be useful to architects in works of a magnitude that would not necessarily come under the structural engineer's care. If it is really successful in doing what we understand it does, I do not see why it should not do it for quite small walls as well as for vast constructions.

The next subject on our list is the utilisation of bomb débris, which we call "rubble utilisation." That is not an exactly right term, but, it having once been used, it seemed to stick. The German cities were destroyed to a far greater extent than ours, and the Germans had a far vaster problem than we had in getting rid of and using débris. Therefore perhaps their experience has not very much to teach us. They have, however, done a considerable amount of work on the cleaning of old bricks, the sintering of rubbish of all kinds from débris to make concrete aggregate, and that sort of thing, and I am glad to be able to report that a team is being formed to go to Germany in order to collect information on those subjects.

The next item is power tools. We sampled that with the greatest care, and we found one or two interesting power hand tools, one of which was a wide bed planer which allowed one to plane a considerable surface without having a side guide and which restricts the width of surface that can be planed with a portable mechanical plane. I understand that our recommendations in this respect are being followed by the Ministry of Works field test units at Thatched Barn.

Now we come to items which we hardly did more than list. We thought they might be required afterwards by British interests, but we did not think there was very much in them. The references are in our report, and we went to considerable trouble to show our authority for the references. There are three more items, however, which stand out. The first is that Professor Graf is prepared to complete a book finalising German experience on external rendering, if someone will commission him to do it, and I believe that is under serious consideration. You will remember that a good many years ago members of the Building Research Station were in Central Europe trying to find out why the European external rendering never cracks, as contrasted with ours, which always does. They brought back the answer, if we would only learn it, but a book by such an eminent expert as Professor Graf, finalising the German views on the whole subject, could not fail to be of use to us. A second and smaller point is that the Germans have developed a fibre glass acoustic plaster, and we give the references for that. Finally, we suggest that the subject of covered trickling filters for sewage purification might well be pursued with Dr. Imhoff of Munich, who we understood when we were in Germany was still at Munich and has done important work on this subject.

To summarise the position in regard to the action taken on our report, I may say that the Chief Scientific Adviser's Department of the Ministry of Works has taken the responsibility for seeing the work go forward, a study group has been formed or is being formed on each item, and there is a continuing liaison with Germany through a member of the Chief Scientific Adviser's Department being posted to the appropriate Division of the Control Commission. Teams for investigation in Germany are still continuing, and the liaison officer at the Control Commission will facilitate the work of any specialist teams that go to Germany.

There is information from Germany for you to use if you will. If there is any point on which you feel keenly that further information is desirable and should be obtained, even if it is quite a small point, you are at liberty to ask for that information. I should explain that, from the point of view of the R.I.B.A. I am still the liaison officer for furthering this work, and if any architect wishes to go to Germany or wishes a subject to be studied, it is my duty to facilitate that.

DISCUSSION

MR. BLOOMFIELD said that shell construction in England had been developed on rather different lines from those adopted in Germany, owing principally, to the different aptitudes of the people working on it in this country. The construction and the design, principally the former, had been simplified to a considerable extent. In Germany there was a greater tendency for developments to take advantage of skilled labour, the Germans going to a very considerable amount of trouble in order to save a comparatively small amount of material. In England an attempt was made to simplify things and, although on the basis of quantities a little more material was used, the method seemed to work rather better.

MR. JOHN MASON, A.M.I.C.E., agreed with Mr. Bloomfield and said he thought the tendency to economise in labour and use more material was largely a question of the relative costs of labour and material. In America, where labour costs were high, the tendency was even further developed.

There had been a certain amount of shell construction in this country. One of the difficulties which the team had experienced was due to the fact that there had been a black-out on information in this country, and it was not until he had returned from Germany that he had heard of some of the shell construction in this country during the war.

MR. W. T. JACKSON [*A.*] said he was very interested in the remarks made by Mr. Hartland Thomas on the subject of powered tools and he would like to have some more information in that connection, particularly on the extent to which the tools had been used on new construction in the field in Germany.

MR. ERIC WHITE said that hand-powered tools were used, as far as the team had been able to see, more in connection with the heavier type of timber construction to which Mr. Hartland Thomas had referred. They were mostly woodworking tools and woodworking tools of a very heavy structure, which would deal with the type of scantling that was used in civil engineering construction. The team had not had much opportunity of seeing what was actually done on site. They had seen nothing whatever of electrical tools being used on building sites, but observation of work that was going on in the smaller districts with the smaller type of builder had shown very little evidence of new implements being used. In fact, many years ago he had had the opportunity of observing German craftsmen at work and they appeared to be using the same type of implement as the German craftsmen were using to-day.

With regard to payment by results, the complicated German scheme worked first of all on a flat rate. It included the grading of craftsmen either plus or minus the rate and in fact it was an elaboration of piecework. He had already given evidence on the subject before the National Production Council for Building, and, judging by the reactions of the members of that Council, he did not think that any part of the German system of payment by results would be acceptable to either the employers or the employees in this country.

MR. W. T. LEWIS (Secretary of the Codes of Practice Committee), referring to Mr. Hartland Thomas's statement that the Nazis had achieved modules by issuing a law on the subject, asked whether the team had found in Germany anything comparable with the work that was going on at the present time in this country on Codes of Practice.

MR. R. LLEWELYN DAVIES [*A.*] said he thought that, generally speaking, the centralised control or centralised guidance of building such as existed in this country and was exemplified by the Codes of Practice was remarkable by its absence in Germany. Generally speaking, somewhat in contrast with the ordinary conception of the Nazi State as a highly integrated and organised unit, the team had dis-

covered that there was very much less efficient control and guidance of building than there was in this country, and, whilst they had found that interesting studies and researches had been carried out on the subjects to which Mr. Hartland Thomas had referred, those studies and researches had nearly always been made from the point of view of the producer or of a particular material or product. The team had not been able to find any significant studies of building from the point of view of the user or consumer, such as those which represented a very important section of the work in this country. He therefore thought it was true to say that there was not any effective guidance on building standards in Germany, either as a wartime measure to reduce the number of standards or as a peacetime measure to improve them.

MR. J. S. FOSTER [*A.*], referring to Mr. Mason's statement that there had been a black-out in this country for a considerable period on information regarding shell concrete construction, said it would be interesting to know whether there was any information available at the moment on that subject and its theory and possibilities.

MR. JOHN MASON said that since he had delivered a lecture on shell concrete at the Institution of Structural Engineers he had heard that Mr. Vaughan, of London University, proposed to write a book on the subject, but he did not know whether that would be primarily of an engineering character, a general character or an architectural character. He had recently learned that a large factory of shell concrete construction had been built for one of the Ministries during the war.

MR. C. C. HANDISYDE [*A.*] said that about two hours previously the Committee which was responsible for the Architectural Science Board lectures had decided that it would try to arrange for a lecture to be given on shell concrete during the present session. With regard to the stress grading of timber, there was now a British Standard Specification for it but he had not seen any instances of the use of the stress grading system in this country. He would like to know whether stress grading was a pious hope or an accomplished fact in Germany.

MR. R. LLEWELYN DAVIES said he could not give a positive answer to Mr. Handisyde's question. The team had not seen any stress graded timber or met any practical users of timber who confessed to using stress grading, but Professor Graf, who was primarily responsible for the German stress grading system, assured the team that it had a fairly widespread utilisation.

MR. R. LLEWELYN DAVIES said that in the German specification the stresses which were allowable in the calculation of timber bridges and structural members were coupled with the stress grading. Therefore if a German engineer wished to use those stresses he had to be satisfied that the timber he was using conformed with the grades which were laid down in the specification, which was one of the German standard specifications.

MR. H. V. LOBB [*F.*] said he would like some amplification of the point which Mr. Hartland Thomas had made with regard to external rendering. He thought it was generally accepted among architects in this country that the standard of external and internal finish in plaster work was very much higher in Germany than it was in this country, and he wondered whether that was correct. Could the team say whether they had in fact found a higher standard of finish in Germany, or whether the Germans had troubles with cracks and shrinkages, particularly on account of temperature variations.

MR. ERIC WHITE said he thought there was both good rendering and bad rendering in Germany and that applied also to internal finishes. There was enough information at the Building Research Station to show that the fact that cracks were obtained in this country and not in Germany was largely due either to the strength of the rendering or to the laitance which was left there.

MR. D. H. MCMORRAN [*F.*], referring to the application of the grid to planning, said he did not think the method adopted by Germany during the war should be followed in this country but that a wider field should be taken. Mr. Hartland Thomas had referred to further research being carried out on the subject, and he would like to ask whether in fact such research came within the province of the Architectural Science Board.

MR. HARTLAND THOMAS said that if a study group was set up on the subject and found itself getting into deep water it would have to do what had been done in the case of other subjects, namely, make contact with another committee of the Institute to deal with its end of the subject.

MR. R. LLEWELYN DAVIES, referring to the subject of the dimensional grid and the way in which the Germans had made an effort to tackle it, said it should be borne in mind that the Germans had started to deal with the problem very much further back than had been the case in this country. There had been hardly any standard dimensions in German building products; there had been no such thing as a standard metal window, a standard door size or even a standard brick size; in fact, he thought there had been about thirty different brick sizes in common use in Germany at the beginning of the war. Therefore the Germans had not started by taking all the different standard dimensions in existence and choosing the lowest common multiple which had tended to be the way in which the question had been approached in this country. The Germans had had very little with which to start and they had chosen their grid on grounds which, while perhaps not being purely architectural, were almost mathematical or philosophical. In fact, the dimension which Professor Neufert chose for the purpose was chosen largely on the mathematical ground that 1.25 metres represented an attempt to get the one-half, one-quarter and one-eighth division into the metric system, the metric system being lamentably lacking in that division.

MR. T. T. ALLEN said he thought it was a good thing to work to a grid and that it might be easy to do so in the case of a large building but that difficulties would arise on smaller jobs, particularly in the case of domestic work, where there were often standard sizes of fitments and where, owing to there being more sub-divisions in the building, the thicknesses of walls would create a difficulty in any standardisation of size.

MR. HARTLAND THOMAS said he did not wish to reply in detail to the point made by Mr. Allen, because it was one of the points that would be dealt with by a Study Group if one was set up, but the general answer he would give was that when there was a standard grid it exerted a strong influence on everything else to fall into phase. The British workers had been stumped by the problem of wall thicknesses, because if one began with the standards of details and tried to add them up, one got a great many variations.

MR. E. LOEWY, B.Sc., said that the subjects in which he had interested himself were not architectural to any extent, but fortunately they also had been largely covered by the Ministry of Works, partly as a result of the work of the team of which he was a member and partly as a result of the work of other teams that went to Germany and discovered similar things.

A team had been to Germany to investigate the maritime works, such as dry docks and harbour installations. The report of that team had not yet been published, but it was very interesting and recommended that the inland side of the waterways should also be investigated.

One of the unique features of the German canals was ship lifts, as they were called, to overcome a whole train of locks at some of the points where there was a difference of level of 100 feet or 200 feet between sections of a canal; the ship was put into a great tank and the tank was lifted up. That system might have its use in the Dominions if not in this country.

As Mr. Hartland Thomas had said, the German research establishments in hydraulics were of particular interest because it had been decided to establish one in this country. The Germans were very good and thorough in such matters and had a number of first-class establishments which, it appeared, were just being left to rot.

MR. E. K. ADAMSON, M.I.C.E., said that there was one subject on which he could speak from experience, namely, road surfacing. He thought the Germans were very much behind on that subject. One noticeable feature about the autobahn bridges was that the Germans seemed to put expansion joints in every little hole and corner where there was any excuse for doing so, and in many cases where there was no excuse. The team had seen some interesting hangars which were portable and to all intents and purposes collapsible. The system of making them was by means of tubular trusses, hinged in the centre. They were covered with heavy corrugated iron, over the pylons, and were laid flat on the ground, after which they were simply pulled up together.

MR. E. LOEWY said, in reply to a question, it was an interesting point that the team had not been able to obtain any information in Germany with regard to materials for expansion joints in buildings, although they had hoped and expected to do so. The German chemical industry, which was known to be very big and important, had not yielded anything on the subject of expansion joint filling materials, which rather suggested that the expansion joint technique as such was not a speciality of theirs.

MR. HARTLAND THOMAS added that the team had brought back one document on the subject of an expansion joint in engineering, namely, a document on the use of thin metal for expansion joints, which was now in the library of the Ministry of Works. The documents and photographs referred to in the report as having been brought to this country were in the library of the Ministry of Works, Lambeth Bridge House, and could be seen there. He believed that in some cases people who wished to study them were allowed to take them away.

OFFICE ORGANISATION

AN INFORMAL LECTURE DISCUSSION AT THE R.I.B.A. on 22 OCTOBER 1946

MR. E. D. J. MATHEWS [*A.*], in the Chair

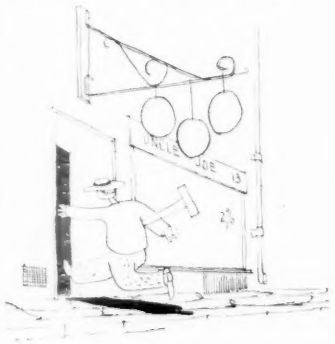
The CHAIRMAN: As you are aware, this is the second of a series of lectures on Office Organisation which has been sponsored by the Lectures Sub-Committee of the Public Relations Committee, and this evening the subject is "Office Finance."

I think we cannot stress too much the importance of the whole aspects of organisation, particularly those of finance, however awkward they may be or however pleasant they may be. I feel quite certain that we cannot expect good work to result from our offices if we ourselves are not completely organised and masters of our own situation. For those of us who have come back from the services and for others who are changing their plans and starting up in practice again, this is a great opportunity to hear informally the experience of others so that we may pool our resources and gain thereby.

Before I call upon the speakers this evening there is just one point I should like to mention concerning this question of finance. Obviously it would be very easy to digress from this subject to the question of our fees or remuneration and to enter into a discussion on the merits or otherwise of the present scales. We should probably talk all night on this subject only to find tomorrow morning that our fees were just the same. Therefore, I shall ask you in the discussion to confine yourselves entirely to the present scales and not to open a discussion on the actual fees or remuneration.

This evening we have three speakers again, Mr. Burnett, who will speak primarily on the sources of finance and their initial management; Mr. Chitty, who will speak more particularly on the office management side of finance in an architect's office in private practice, and Mr. Boys who, as you probably know, is a chartered accountant, speaking on his angle and the correct manipulation of money. We give special welcome to Mr. Boys who, as an expert in another profession, can give us the benefit of his views, however severe or critical they may be, on our own shortcomings.

MR. P. V. BURNETT [*F.*]: I am only dealing with certain special aspects of finance and I am not dealing with office management. The first aspect about which I am going to speak is the first thing which should strike the man coming out of the forces and trying to re-establish his practice. It has a much wider field than that, of course, because there are many architects who have not been in the forces but whose practices have been semi-dormant all through the war, and who are now finding the work coming in. They are in a very similar position to those men who have come out of the forces.



. . . "possible sources . . . for borrowing" . . .

The first thing they should ask themselves and should want to know is what is their relevant earning position as a practising architect now as compared to the position of a practising architect before the war? It is a very interesting comparison and it leads to some quite unexpected conclusions.

The source of income of a practising architect is, of course, the R.I.B.A. scale of fees. The standard R.I.B.A. scale, so far as percentages are concerned, is the same now as it was before the war. The only alteration has been in respect of the time charges. But the cost of building has more than doubled, so that superficially it would appear that for a given amount of work a practising architect is getting twice as much as before the war. That is a very superficial argument which has been used against the R.I.B.A. in the discussions on scales of fees, and actually will not stand up to examination at all for reasons I will explain.

"Going to a quantity surveyor . . . means . . . a queue."

The first reason for the difference is that most of the work that is going on to-day is not being carried on under the standard scale of the R.I.B.A. at all, but under special scales. Before the war most of the work in the hands of private practising architects was done under the R.I.B.A. standard scale and carried its 6 per cent. Nowadays most of the work which is going on, such as housing, multi-storeyed flats, conversions, war damage and other work, all have their special scales which are substantially below the pre-war standard scale of fees; so for that reason alone it would not be correct to say that the cost of building has brought about a doubling in the fees of a practising architect. However, I do not think that is the most important reason.

The most important reason to my mind is the time factor. Architects are finding to-day that to carry a job through from the time it comes into the office until it is completed takes very much longer than it did before the war. Before the war experienced practising architects knew within a certain margin how long a job would take to run through. To-day I am afraid in many cases we just have no idea.

Let us take a typical job and run through it in its stages. The working drawings to-day in many offices are taking much longer to produce than they did pre-war. The reasons for that are varied. They may be due to a shortage of staff, they may be due to inexperienced staff just out of the forces and a little stale, or they may be due to the fact that new staffs have not yet realised that they must work together as a team. Whatever the reasons may be, however, it is the experience of architects that working drawings are taking longer to produce.

But let us suppose that that is not the case and that specifications are produced and have to go to the quantity surveyor.

Going to a quantity surveyor to-day almost means lining up in a queue. You have to wait your turn with many quantity surveyors, and there is no doubt that bills take longer to produce than before the war. Even the printing of bills is a much slower job, and when bills are produced and the job has to go out for tender, you are asked to give double time for tendering than before the war. The tenders have to be approved by the Housing Committee or Local Authority and the amount of time that takes is utterly indefinite and cannot be forecast at all. Even when the contract is entered into and building work starts, there cannot be any doubt that the actual building work on the site is taking very much longer than it did before. Obviously it must do, with the present shortage of labour and materials and loss of output.

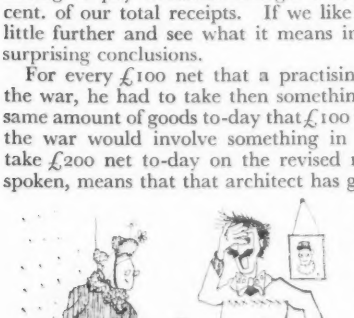
Adding them all together I would say, in my experience, that the time taken now from when a job comes into the office until it is completed is at least double that taken for a similar job before the war. That means, of course, that every job has to carry its overhead charges at post-war rates for a very much longer period and has upset the ratios which most of us knew before the war between our overhead charges and our total fees.

A third reason, perhaps not quite so important but at the same time a nuisance, is the fact that whilst Local Authorities and Government departments are quite willing to enter into contracts under seal with private practising architects to pay fees at certain stages, when those stages are reached and the architect submits his account, he often has to wait a long time to get it paid. Taking all those things together, there cannot be any doubt that the practising architect to-day, so far as earnings are concerned, is very much worse off than he was before the war.

How much worse off is he? That is not an easy question to answer, but we can get some guidance if we look at the ratios between overhead charges and total fees. Of course, ratios of that character were never constant. They varied from practice to practice according to the organisation, according to the type of work, according to the volume of work and so forth, but taking a reasonable period of years before the war and taking a number of practices, I think it would be fair to say that before 1939 for the moderate size architect's practice, excluding surveying work, overheads were something like 35 per cent. to 40 per cent. of the total fees received.

Let us look at the position to-day. Speaking from the point of view of my own practice and that of other architects with whom I have discussed this point, I find that most of us are having to pay overhead charges amounting to at least 60 per cent. of our total receipts. If we like to carry this argument a little further and see what it means in cash, we arrive at some surprising conclusions.

For every £100 net that a practising architect earned before the war, he had to take then something like £160. To buy the same amount of goods to-day that £100 would have bought before the war would involve something in the nature of £200. To take £200 net to-day on the revised ratio about which I have spoken, means that that architect has got to take gross over £500 in fees. That is without the question of taxation. Therefore, although the cost of building may have doubled, the takings of an architect, to be in the same position as he was before the war, have got to be more than trebled. Anybody who is clever at arithmetic and who desires to apply taxation to those figures will arrive at even more astounding conclusions.



"*A third source of finance— . . . is a relation.*"

Those are the grim facts that a man re-establishing his practice to-day has got to face up to. He has got to realise that any experience he had before the war goes by the board so far as the relationship between his net earnings and what he may take in fees is concerned. Nevertheless, he has got to get his practice going. He has got to finance it in some way.

Before the war, if we had some money at a certain period it meant that we had worked for it the previous year. If we were busy to-day it meant that the next year we would have some money. If we were slack to-day, it might mean that the next year we would be hard up. That was the nature of an architect's practice. For the man re-establishing his practice to-day, however, there is no last year. He has got to find the money now so it is worth while considering his possible sources of finance.

Of course, finance is one of those terms which suggests a certain amount of wizardry with regard to money, but what it means to you and me is borrowing, and that is what we have to look at. There are three main sources or possible sources open to architects for borrowing and I want to look at each of them and point out what they cost.

The first source of borrowing is, obviously, the bank. A point that I find architects do not realise in borrowing from the bank is that in going to your bank to borrow money you are not asking for any favour. If your bank could not lend money it would go out of business to-morrow. Its business is not just to take money and issue it on the presentation of a cheque. Its business is to lend money, which is the way it makes profits. So you are asking no favour, and if you go to the bank you will receive assistance so long as you are able to offer them some security for a loan or overdraft.

That security must be a good one. It must be something which is readily saleable at a recognised or not wildly fluctuating price, and if it is of that character the bank will lend you a high proportion of its total value. If your security happens to be of a type that fluctuates wildly you must expect less. If you have no security to offer you may be able to offer them the security of somebody else in the form of a personal guarantee, but you cannot borrow anything substantial from the bank without depositing good security for it.

The cost of borrowing from the bank is usually 5 per cent. You may be lucky and get it for 4½ per cent., which sounds high in relation to rates of interest on Government stocks and things like that. Actually it is not so high as it sounds, because providing you are borrowing only for the practice, the interest you pay is chargeable against profits for income-tax purposes.

The second possible source of finance is, of course, the architect's own personal investments or savings. Some architects are fortunate enough to have possessions of that description and some are not. For those who have them, financing themselves is the obvious thing to do; but it is worth while considering it in relation to borrowing from the bank.

If an architect has investments and sells them to finance himself, he loses the whole of the interest on those investments immediately. If, however, he lodges those investments with the bank and draws against them up to a fixed sum, he only pays interest as he draws on the money.

Also the cost of using your own investments for borrowing purposes depends, of course, entirely upon what interest or dividends such investments brought in. They may be expensive to use for that purpose or they may be nice and cheap and save you money. That point I mentioned has to be borne in mind, however, once you sell a security to finance your practice you lose the whole of the interest.

A third possible source of finance is a friend or relation. Many a young architect has founded a practice on borrowed money from a friend or relative. At the same time it is best avoided. Your friends and relations are probably your clients and it never does to borrow from a client. That is the worst possible thing any architect can do for the obvious reason that a client looks upon his architect as being an individual in whom

he can have confidence with regard to the handling of large sums of money. A man who has to go to his client and try to borrow money does not encourage confidence being placed in him as far as large sums of money are concerned.

That raises one point of criticism about the scale of fees if the Chairman will permit me to mention it. Before the war the R.I.B.A. scale did provide for the payment of a portion of fees —one-sixth in fact—on completion of the sketch plans and approximate estimates. I know that very few architects asked for any fees at that stage; they waited until the contract was entered into and then asked for two-thirds. It was probably not of great value before the war when a job went through quickly, but with jobs going through slowly, as they do to-day, that clause is of the greatest value, and I cannot but regret that it has not been carried forward into any of the special scales for work going on to-day as with Government departments.

Finally, I want to say this. An architect who is re-establishing his practice to-day has got to face some rather grim financial facts. There is, however, no doubt that he should not be unduly perturbed about them. He should remember that during the next ten or twenty years an enormous amount of building has to be done all over the country, and that so he will get his full share. Therefore, remember that an architects's practice is always something of an adventure, and go forward courageously. Do not worry too much about financial difficulties. Expand your practice while you have an opportunity and I am sure that in the long run you will reap the reward.

MR. A. M. CHITTY [F.]: At the last of these discussions we listened to three very able architects speaking to us on the methods of organising office routine, such as filing, methods of running jobs and so forth, and I must confess that for my own part I was very dismayed by the skill that was displayed in organising office routine. My own office, I am afraid, is of the primitive kind and I am happy if I can lay my hands on that letter which was filed last night. So in talking to you about office finance, I do not speak as an expert but rather from the point of view of running an office day to day. In such an office, however, just as in every other, there are certain fundamental facts to be observed.

I think that perhaps the first duty of an architect is to give value for money to his clients. That is very obvious, but in order to give value for money, clearly one must know what the value is at which an architect is aiming and what the value is by which the client will judge. One can only assess that, I think, in terms of analysis of time related to costs.

Every architect will agree, I think, that jobs carried out vary greatly in their profit-making capacity. There are jobs which are obviously unpaying but which one continues to do and upon which one continues to spend quite a lot of time quite uneconomically for a number of reasons. One may spend time on a very small job and endeavour to do it as perfectly as one can with some other motive in view which is quite justifiable, namely, that of producing from the same client later on a million pound job. Then there is the difference between jobs by nature of the actual type of the building. In my own practice we found that industrial buildings may carry one proportion of overheads in relation to fees taken, whereas another sort may have a very much lower or higher proportion.

I am not sure that I should agree with Mr. Burnett about his pre-war figure of 35 per cent. to 40 per cent. as an average. I should have said that something nearer 55 per cent. was the order of the day. Of course, this may be due to various reasons, one of which may be inefficiency, but I think it is clear that some classes of work will be quite different from others. You may get a job where there is a degree of repetition, where your overheads may be comparatively light and profits therefore greater. You will find domestic work is probably the most costly of all architect's work—that is to say, the design of a two thousand pound house for an individual client. This may be totally uneconomic. We used to find before the war that we had to ration ourselves to so many houses of this kind in a year and try to balance them off against the more lucrative work. That is reasonable. The two thousand pound house for the individual client is a complex and difficult problem. For this small fee—according to the scale at 6 per cent.—say, £120 one has to spend a very long time investigating the way one's client lives and find out what his problems are and then interpret all that in terms of planning. I think if this problem is solved in a particular case the cost will be extremely high. Then I have no doubt that the most costly work of all is work in London upon housing at the present time with the innumerable difficulties, legislative, technical and procedural.

". . . there's nothing frightfully mysterious about double entry . . ."

Therefore, one has straightway to try and apply some critical ability to this problem of seeking which type of job one is wanting. Obviously there are dangers in specialisation. If one happens to specialise in a particular class of work which at present is extremely difficult or is demanding a low fee for any reason, then one will be at a disadvantage.

I think there is a further difficulty which is, perhaps, supplementary to the point Mr. Burnett mentioned about the amount of work that has to be done to-day. I know of architects who find it necessary to employ staff which was not required before the war. Perhaps a man has to be employed to keep close contact with Government departments in order to ensure that answers to letters are received at the right time. Perhaps a man has to be employed whose sole duty it is to do part of the builder's work, or what before the war would have been considered builder's work. It is this necessity for extra staff which all tends to support what the last speaker said about increased costs involved in running an office to-day.

Right from the beginning one has to consider this choice of work. Obviously when one is starting one has less choice and is less able to reject work which is not desired. I remember, before I trained as an architect, going to a very distinguished man now dead who himself was an architect, and he assured me that to be an architect was an uphill journey all the way. Well, I think he was quite right although I was not so sure at the time. Presumably as one moves up the scale one can become more selective in that way, but in order to enable one to find out which types of work are more costly than others, it is necessary to bear in mind that time is probably the one single item which is more important than anything else in the office. One can assess the cost of any job on the basis of so many man-hours at wages of those engaged upon it, plus some suitable allocation for overheads, rent, rates, cleaning and so on, and by keeping a diary of each job so find out how this works out in practice.

That, I think, is very obvious, but it is very easy to overlook the necessity for it and I can give you one small example. We had a job a little while ago for which we thought we should have one hundred drawings all with the same title on them. We obtained a hundred sheets of tracing paper with the standard lettering at the bottom, with the standard border and the usual titling, and the bill for these sheets—they were of the cheapest type of paper obtainable—amounted to about £7 10s., or 1s. 6d. per sheet. Now at first glance it occurred to me that that was very expensive and it seemed a large sum to pay for so simple a procedure when we could have used our own paper and stencilled it. If, however, it is worked out in terms of somebody working in the drawing office at, say, £10 a week, it will be seen that if he spends half an hour on that particular job of lettering one sheet, it will cost about 5s.

" *diary system . . is the best.*"

With regard to the question of the amount of work accounted for by a proportion of fees at different stages of the job, the R.I.B.A. scale which suggests by implication that two-thirds of the work has been done by the signing of the contract was, I suppose, a correct assumption before the war, and from that one estimated the remaining one-third was to cover the cost of executing the job. Clearly the weight has completely shifted now and the execution of the job takes up far greater time and energy and far greater cost than the preliminary stages.

The only other major item that occurs to me is that of taxation, but that is a matter which can be dealt with by Mr. Boys far more ably than by me. My own accountant is much too polite to say what he thinks of an architect's business methods; nevertheless, it is constantly implied at every meeting we have. Therefore, I do suggest there is enormous help to be got by every architect having a very close contact with his accountant.

MR. B. J. M. BOYS, F.C.A. : I feel that a very large part of the ground which I might have attempted to cover has already been cut from under my feet. The first speaker I think indicated his ability to " manipulate " figures every bit as much as one of the sharpest company promoters. So what is left for me to do in that direction I find difficult to decide.

The last speaker indicated that it was desirable to keep records of some sort and perhaps that is where I come in. I agree that it is desirable to keep records of some sort. They need not be very complicated. The type of records one keeps will, I think, all be based on the same foundation and principles, and if those principles are properly applied, even by the man who is in practice on his own and who does his own filing, stamps his own letters and types them (if he is clever enough), they should produce the kind of answers which ought to be readily available with the minimum of effort. If a man does that it should be possible for exactly the same principles to be applied on an expanding system which will grow quite naturally from what has been laid down at the beginning as the practice, as one hopes, becomes large and prosperous.

The object of any financial records must, in the first instance, be to tell you where you are. Mr. Burnett has told you that you have got to have a certain amount of money to start with, and under present conditions that amount of money has to last you rather longer than it might have done pre-war for two reasons. The first is that everything costs much more than it did, and the second is because you have to wait much longer now for money to come in.

Clearly if you are starting in practice you have got to plan out where the money which you have to start with is going in order that you may see how long it will last. Your records should be designed to enable you to see how the actual transactions which are passing through the office compare with that initial budget—which is very important. One knows or can estimate what one's commitments are, and one should see that the actual expenses and the income which is expected do in fact come in or go out more or less along the lines provided for when the practice was started. That is rather a question of comparing the total figures which can be extracted from the books periodically with the total one will have provided to start with, and the records should be arranged in such a way as to enable those comparative figures to be obtained quite easily.

For the man or woman who is starting, the pass book probably tells a story and gives a pretty clear picture, but it does not give the whole picture. It cannot do so because it only records past transactions and gives no indication whatever of transactions which have got to be dealt with in the future. Something rather more than one's cheque stubs and paying-in book is therefore needed. As a minimum I would suggest that one needs a cash book with some analysis columns on both sides, and a petty cash book which will record transactions rather smaller than those for which it is necessary to draw directly from the bank. In passing one might suggest that a petty cash book is of very much more service for obtaining a survey of one's total outgoings if it is run on the imprest system.

The imprest system is this. If you say: " I expect my average outgoings from petty cash will be £5," you draw £5 from the bank and at the end of the week, when you find you have spent, say, £3 19s. 11d. in various ways—which will be recorded—you then go along to the bank and draw out £3 19s. 11d. You know how you spent it so you can put the totals into your cash book and see just where your money has gone instead of waiting until the end of the year to analyse the column marked " Petty cash."

Another thing which is required is a record of the accounts which are sent to clients. It need not be a book; it can be a file, but it should be a separate file to the bills actually sent and should be compared periodically with the cash book in order that those accounts which have been paid can be marked off. It enables you to see quite clearly the accounts which are still owing to you. As the practice grows that probably will not be sufficient and you will have to open a ledger account, but the principle is the same.

There is nothing frightfully mysterious about double entry; it is only a system to ensure accuracy. While one is in a small way, one can achieve the same results without making a debit and credit, however, by adopting the methods I have suggested.

The next thing I regard as very important is the keeping track of one's commitments, because that is a thing which one has to take into account before one starts at all to see how long the money is going to last. One aspect of commitments which it is a little difficult to ascertain is that of income-tax.

I came here to talk about office finance and administration and not income-tax, because I could not hope to cover that subject in ten minutes; but if there are any dark corners on which you would like some " borrowed " light, I will, with the Chairman's permission, do my best to assist you in the discussion.

There was one question which Mr. Burnett rather threw at me and that concerned the desirability or otherwise of borrowing money from the bank, and whether it paid one more to have an overdraft or to sell investments. It is a highly complex question and it really depends very largely on the individual circumstances.

It is possible to arrange it in such a way as to make it very profitable. From the taxation point of view you would arrange it so you borrowed money from the bank in the first year and if you were then able to get hold of some capital on which you paid interest after deduction of tax, instead of paying it gross to the bank you would find that you would be allowed one year's bank interest as an expense for two or possibly three years and you could, therefore, make quite a handsome profit on it. That is, however, a little technical and depends on circumstances.

Mr. Chitty touched upon the question of time records, and for any professional man it is true to say that time is money. Time is what he has to sell; that is all. He is selling his brains and from that point of view, therefore, it is at least as important, in my opinion, for you to keep a record of the time spent as it is to keep a record of £ s. d. It is very simple. An hour is just as easy to put down as £ s. d. I should think that half an hour would normally be found to be the smallest fraction which could conveniently be handled.

For that I would strongly recommend a double entry system. As I said before, double entry is simply a means of helping one to ensure accuracy, and if you debit a client with one hour, you should credit some account with the same amount and then periodically you can compare the debits with the credits to make sure you have charged up every hour which is properly entered against a client.

It is important to have that record of time because although the most part of your remuneration is drawn, I believe, from a

percentage on the cost of the work which you are designing and supervising, there may be extra jobs which come in in the course of the main project, which, I assume, would not be covered by the scale but for which you would be entitled to charge. Once an organisation gets beyond the one-man stage it is extremely easy to overlook the fact that there has been some little extra work which might go on to the bill, and in that way time records are of considerable value. You see that the cost of the job has come out quite disproportionally to revenue and it puts you on enquiry. In that way you will probably pick up an odd guinea or two which will pay for the time spent on keeping the records, if nothing else.

It does also serve to show whether a job is profitable or not, which brings me back to the point Mr. Chitty mentioned, that there are some jobs which do pay and some which do not. One ought to know what those jobs are. Obviously by rule of thumb methods one can probably guess at the answer, but if one has concrete evidence in the shape of time records, it is very much better, because there are many people who have gone bankrupt thinking they were making a profit on things when in fact they were making a loss. If they had kept books efficiently they would have known they were wrong.

If you have the prospect of more work you have to start paying expenses immediately and have to wait for a return, but that is where our old friend the budget comes in. By having a proper budget you should be able to go forward with greater confidence on any programme of expansion necessitating extra staff, etc., than if you were merely speculating. Although I think it is not perhaps within my province, it is true to say that it would be false economy not to take on extra staff even if it meant a little financial strain provided one could see in due course that it was going to be remunerative. Clearly the more time one has free oneself to develop ideas and make contacts the better, and if one is not going to be ultimately out of pocket by employing somebody else. I think it is the right thing to do.

DISCUSSION

A SPEAKER: Regarding the question of records, I have come across two or three different systems One is to keep a diary in which entries are made every day and posted in various accounts at the end of the week. A second method is to issue sheets with the jobs noted thereon so that the number of hours spent on a particular job can be inserted, and a third method is to have one sheet with all the jobs on together with everyone's name and the time spent. I should like Mr. Boys to tell us if there is any particular merit in any of these systems.

Mr. BOYS: In my opinion the diary system is almost certainly the best and most convenient. It is of great advantage if every assistant and principal keeps a diary in which the time occupied during the course of the day on a particular job is noted together with some brief particulars of the work actually done. At the end of the month that is extracted on to a summary showing the name of the job on the left hand side and the dates across the top. In that way if one has done work for one particular client for half a dozen days you get the total for the month which is extended into the right hand column. If one then adds up the total of each thirty-one days—assuming you have worked all through the time and have not taken any time off—you will get the total hours chargeable for the month day by day which should compare with the total hours charged to each client. One then debits each of those clients in a ledger account kept for him with the amount of hours spent that particular month, and credit the clerks' time with the total hours spent by each individual for the month. We should classify it in principal's time, manager's time, senior clerk's time, junior, typists' time, and so on.

A SPEAKER: There have been a number of suggestions as to why architects' expenses at present are very high, and I think there are a number of reasons other than those which have been mentioned. In our own office we have had an arrangement with one particular client which has seemed to me very sensible from everybody's point of view. It is a large job which will not be built for a considerable number of years, but there is a great deal of work to be done in the meantime in working out schemes, getting approvals from the L.C.C. and so on. In other words, it is a job for which, if payment were made on the ordinary R.I.B.A. scale, no payment would probably be due for a very long time. Our clients understand our position as we o ourselves in this way. They know that if we were being paid on that basis we should in fact have to spend money for many years before we should get any return. Also they know, and we know, that it is much more difficult now to say what are likely to be the costs of the job as compared with what we could have said before the war.

"*Special problems of clients.*"

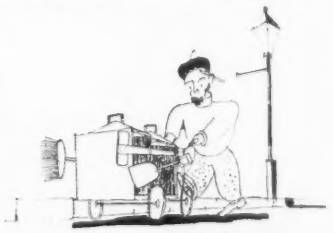
The arrangement we have made with them—which I personally consider to be a good one and I should like Mr. Burnett to advocate it or condemn it—is that they are, in the first place, paying us all the costs of draughtsman's time spent on the job. In the second place that is going to be a permanent payment on their part. Instead of receiving the full R.I.B.A. percentage, we have agreed with them to ask for a lower percentage on the basis that they will ultimately pay for the whole of the draughtsman's time. They are paying us X pounds per year for a stated number of years to be deducted ultimately from the percentage paid on the job. By that means we avoid the very heavy burden of expenses for some years and we also avoid a considerable proportion of the risk of the amount that the draughtsman's time will take. Also if they change their minds and decide that they would like a different version worked out, all the draughtsman's time is their responsibility; and they, being a firm with a large number of responsibilities, realise that they have to pay for it and therefore avoid unnecessary work of that kind. Does Mr. Burnett consider that to be borrowing from a client in the bad sense?

MR. BURNETT: I think the real reply to the question is covered by the R.I.B.A. scale of fees itself. I should like to draw attention in particular to an alteration which was made in the scale in 1945. I have not the scale before me but I know it fairly well. I think you will find if you read the scale carefully that in 1945 an alteration was made in the method of payment which did provide for an architect drawing instalments of fees as the working drawings were prepared. The arrangement to which the speaker refers is not by any means borrowing from clients. Borrowing from clients does not mean making an agreement with a client to pay in some different way to the R.I.B.A. scale. You are entitled to make any agreement you like with your clients as long as you do not lower the scale.

By borrowing from a client I mean where a young architect has no special agreement with a client and the client has simply been handed a printed scale. The architect, as he goes along, finds he is a good bit out of pocket and thinks to himself: "Well, old so-and-so is a decent sort of chap, I am sure if I explain matters to him he will not mind but will let me have something on account," and he goes along to so-and-so who lets him have something on account. That is all very nice, but old so-and-so is probably a business man and immediately loses a certain amount of confidence in that architect.

The speaker has also raised two other points of importance to architects. The first one is whether or not it is wise for practising architects to let their clients know exactly what their production costs are. The second point was in connection with the question of regular salary. A good deal of that has been going on in the last year or two and there is a certain reason—one which Mr. Boys will know much more about—for clients wanting to pay these retaining fees before the job is done rather than waiting until the work is completed. I think that reason may be summed up in the three letters—E.P.T.

A SPEAKER: I would strongly agree with Mr. Chitty rather than with Mr. Burnett with regard to the probable cost of architects' work. I found that from the time I had one assistant until now my expenses have never been less than 60 per cent. of the gross fees, and during certain periods when the practice was expanding they did go over 70 per cent. I think that is extremely important because it also ties up with Mr. Chitty's other point that clients must get value for money. It has become more and more important in recent years that architects should give service which means, in



. . . "*many methods of earning money*" . . .

"... *if one in the course of that visit to Edinburgh, has lunch ...*"

effect, that two-thirds of his fees go in expenses.

The question of making arrangements, other than the R.I.B.A. scale, is one which almost everybody has to follow to-day. If you go to your clients they realise very fully the difficulties created by present building contracts, and they are perfectly satisfied if you give specific periods on which you will expect to draw fees. In no case have I found any difficulty in this connection.

A SPEAKER: Can Mr. Boys tell us whether it is more usual to reckon overhead costs on gross profits or on actual labour costs? That means the assistants' time including the time spent by the principal.

MR. BOYS: I think one is entitled to give a Joadian answer there and say it depends upon what is meant by "overheads." In an architect's office I think that the whole of the expenses are, in a sense, overheads, and all the percentages that have been quoted this evening have been percentages of turnover. I think that in a professional office that is probably the way in which overheads are recorded.

I should say that all salaries are part of one's overhead expenses. One can also say that rent is a fixed amount which goes on irrespective of whether one has two or three people in a room which will hold three or four; and if those people are productively employed they are direct expenses—overhead expenses varying with the number of people occupying that room.

There are two sorts of overheads. In a manufacturing business you have direct costs and on-cost, and the professional man also has direct costs and on-cost. The percentage relationship which the direct and indirect bear to each other must vary, I think, from office to office according to whether the staff one has available is fully employed or not. From the professional man's point of view, he would regard the whole of his expenses as overheads.

A SPEAKER: I should like to ask Mr. Boys if he would just touch upon income-tax, not in detail but rather in principle as it affects the young man starting out. I have had one or two surprises and I think some of us could be forewarned. I refer particularly to the attitude which the income-tax inspector adopts towards the young man in his first few years. I gather there are various ways of tackling the problem and that it is possible to benefit to some extent by a "carry-over" for a period of three years.

There is the question also of whether you have accounts dealt with on the basis of cash receipts and expenses or whether they are dealt with on the basis of estimated fees. I would like Mr. Boys to tell us something about what happens at the end of the year when, having assessed your income-tax on what you anticipated earning, you find that the income-tax inspector asks you about the work in hand.

Again there is the small point as to when you should finish your financial year. Is it wise to finish on 30 April so as to line up?

MR. BOYS: It is true to say that, generally speaking, in the early years of any new business the taxpayer is in a fairly favourable position. He starts off with the advantage that his first accounts will normally form the basis for three years tax assessments. I am speaking rather broadly but I must do so in this case. The reason for that is that one is assessed on one's actual earnings for the first fiscal year which ends on 5 April. One is assessed in the next year on the profits of one's first completed year, and one is assessed in the third year on the profits shown on the accounts made up to a date in the year preceding the year of assessment.

If one starts in practice on 1 May 1946 and makes up the accounts for a complete year until the following 30 April, one's first income-tax liability is in the year 1946-47, that is, the year ended on 5 April. Then one takes the proportion for eleven months and five days of the profit agreed with the revenue authorities for that first year. The next year you take the whole of the profit for the year ending 30 April 1947 and for the year 1948-49 you take the profit to 30 April 1947, because they were the last accounts made up to a date in the year preceding the year of assessment which began on 6 April 1948. If you have done as well as you expected, quite clearly the profit in your second and third years will be substantially more than the profit in your first year. If for any reason it has not worked out in that way you have the right in your first three years of assessment to go back to actual profit. For example, if you make £1,000 in the first year, £500 in the second and £750 in the third, on the normal basis of assessment you would pay tax on £1,000 three times; but if that is not borne out by results, you would pay tax on £1,000 in the first year, on £500 in the second and on the £750 which you actually earned in the third. That is a very valuable option which is applicable in the first years.

On the question of date of accounts, if you are an optimist and you think the practice is going to expand, I would say make the date for the completion of your accounts in each year as soon after 5 April as you can. In that way you will always be paying tax on a figure less than your actual profits if they are going upwards. There is an adjustment in the final years.

With regard to receipts and payments, it is a difficult question. You can, by agreement with the inspector, take either basis, but in the first years the inspector will almost certainly insist that some value should be placed on uncompleted work. Quite clearly, one may have been working the whole of the year on some big job and made no arrangement whereby something is obtained on account. You might have earned absolutely nothing but, on the other hand, you might have paid out a lot of money so your accounts will show a loss. That loss is quite true, but in terms of real income you have created a potential asset which will be realised in the next year and which it would not, therefore, be fair to ignore entirely. Some value, therefore, should be placed on that incomplete work. What value should be put upon it is a question of negotiation and, generally speaking, an inspector of taxes is more experienced in that kind of job than the architect. Therefore, the architect would be at some disadvantage if he approached the inspector unaided.

A SPEAKER: A very vexed question is that of entertainment allowance. We are having a bit of an argument with our accountants at the moment over this matter. We find that clients come up to see us and take us out to lunch or stand us a drink, and naturally in return one wants to do the same thing and we actually do a certain amount. It is all friendly and simple. Our accountants' view is that according to the terms of the Institute's Charter we are not allowed to solicit for work and that entertaining of that sort might be termed soliciting. Therefore, they could not see that we were justified in claiming any allowance for that.

MR. BOYS: In point of fact there is a legal decision of the Courts* against any allowance for professional men for purposes of entertainment, but in practice I think that an allowance of some kind can in fact be obtained in nearly every case. I do not think it will ever be so generous for the professional as for the commercial or industrial man.

It is difficult to deal with the particular case mentioned, because the question of professional etiquette might arise. If, however, the client is already an established connection I should have thought myself that to buy him a drink or possibly give him a meal in not unpleasant surroundings would be much more like lubrication than solicitation. I have not studied your Charter, but I am a little surprised that the accountant should have brought the Charter up in evidence against his client. I think that most accountants would probably have waited for the income-tax inspector to do that.

A SPEAKER: Does Mr. Boys consider that the time spent by a principal should be included when reckoning the cost of the job against the fees received, or should the principal just reckon his profit as being the fees received less the wages of his assistants plus the overheads?

MR. BOYS: I am a little doubtful as to whether that is a question for me, but I should have said the odd percentage which we have been talking about is really the remuneration of the principal. It represents the value of his time and also represents some reward for the capital employed in the practice. I do not think it forms part of the overhead expenses however. Clearly, though, it is a factor which must be taken into consideration in arriving at whether the job has proved profitable or not. If a principal has spent one hundred hours on a 120-guinea job, generally speaking, I should have said that that job was run at a loss. I am speaking, of course, of a case where the principal is at the head of a firm in which there is some organisation. If one is starting up on one's account, one might consider that not bad remuneration. The principle has been established that no general entertaining expenses are granted, but if expenses are incurred in connection with a job, I should imagine they were expenses of the job. If one goes to Edinburgh to look at a job there I suppose circumstances might arise in which the expenses incurred were chargeable to a client or not, and if one in the course of that visit to Edinburgh has lunch—which one presumably would have—one would be entitled to include that in the total outgoings.

Drawings by John D. Cordwell [S.] and W. F. Mullins [S.].

* Mr. Boys has written to say "I can, in fact, find no reported decision of the Court—I told the questioner that my reply was based on hearsay. Decisions of the Special Commissioners on appeal have been based on the principle that expenses incurred in actual business negotiations are allowable, but not expenses incurred in creating the kind of atmosphere from which business may arise.

SCHOOLS AND STUDENTS

This is the beginning of what is intended to be a regular JOURNAL feature. It will be written specially for students and, we hope, largely contributed by them. By the term "student" is meant everyone from the newly joined probationer to the distinguished Finalist who is undertaking post-graduate study, whether he or she make their way through a school of architecture or by way of the external examinations.

The Architectural Students' Association have undertaken to contribute copy relating to their activities, but it is hoped that individual students also will send notes of their travels, studies and experiences which are likely to be of use to other students. The schools of architecture are, of course, expected to contribute notes of their new activities and successes, but it is desirable not to have purely "official" announcements in this column, for which reason those of the Board of Architectural Education will continue to be placed in the JOURNAL columns, in *Notes and Notices* or in *Examination Results* as is appropriate.

We regret that we cannot undertake to print contributions exactly as submitted; this is because the feature must read easily, which it would not do if it were a welter of literary styles, and, of course, "the Editor's decision is final!" But we shall always do our best to acknowledge a contributor (unless he specially asks for anonymity) and hope this will not deter even the most junior student from making his contribution. Incidentally, if anyone thinks he can improve on the headpiece drawing (by Mr. John D. Cordwell, fourth year, the A.A.) he is welcome to send his effort to us.

On the subject of drawings, the occasional thumbnail marginal sketch and now and again a photograph would be welcomed, though space will be limited. Also the illustration should have reference to the contribution, except in regard to the headpiece.

This is not a correspondence column for arguing such matters as the rights and wrongs of architectural education and theories of design, nor for asking "what is the R.I.B.A. doing about it." There is a correspondence column elsewhere in the JOURNAL, while matters of policy are the business of the "appropriate committee" in any democratic institution.—EDITOR

Commonwealth Fellowship in Architecture

This year the Commonwealth Fund Fellowships, established to enable selected graduates of British Universities to study and travel in the United States, have been resumed after having been suspended throughout the war. Only twenty Fellowships, each of the approximate value of $3,500, have been awarded this time. Of these one has gone to an architect, Mr. A. B. Drought, a graduate of the University of Liverpool. Mr. Drought qualified in the Liverpool School of Architecture in July 1941, when the degree of Bachelor of Architecture with First Class Honours was conferred upon him. On completing his University course he joined the Army, serving overseas with the Royal Engineers. In America he will be pursuing a course of post-graduate study in the School of Architecture and Planning of the Massachusetts Institute of Technology and will also be working under the direction of Professor Gropius, Director of the Graduate School of Architecture of Harvard University.

Arch.S.A.

No apology is necessary for describing briefly here the objects and aims of the Architectural Students' Association because, although a live and vigorous body, it is not yet known to all students and is not fully active in all schools of architecture. At present twenty-three schools of architecture are centres of Arch.S.A.; in some of these membership is automatic and in others individual. Each centre contributes to a central fund the sum of two shillings per head per annum for each member and local centres maintain and administer their own funds.

The aims of Arch.S.A. are to promote unity in architectural ideals, to examine and co-ordinate proposals for the improvement of architectural education, to encourage the interchange of views between members, their instructors, practising architects and others and to stimulate the interests of students of other faculties and of the general public. It publishes a periodical entitled *Plan*.

Arch.S.A. has approached the R.I.B.A. to ask under what conditions a closer relationship can be effected. The R.I.B.A. Council has set up an *ad hoc* committee which is studying the matter and making recommendations. As proposals are still *sub judice* we cannot at this stage make any pronouncement on them.

Students' International Congress, Prague

Ignored by the entire British Press, students of the world met in Prague this summer to set an example in international co-operation which their elders would do well to emulate. Britain's twenty representatives, including three members of Arch.S.A., hitch-hiked their way across Europe to take part, having been unable to obtain any official financial support. Other national delegations were fully supported by their respective governments.

Led by Arch.S.A., the Architectural Section of the International Union of Students was set up, being the first departmental body to form itself. Donald Barron [*A.*], former secretary of Arch.S.A.'s International Committee, was elected the first Chairman of the Architectural Section. Sub-Committees for Information, Professional and Cultural Activities, Publications and Student Exchange, will assist him in his work. A full report of the Architectural Section of the Congress has been received from Mr. L. F. Cave of Liverpool, and will be published in the next number of the JOURNAL as space in this one is limited.

Visits to Sweden and Denmark

Various bodies of students have visited Sweden and Denmark this summer, including two from the Architectural Association and one of twenty Arch.S.A. members from the Manchester Municipal, Bartlett and Liverpool Centres. This latter party visited Sweden only, being met at Goteborg by Swedish students wearing strange academic caps be-tasselled and resplendent. Apart from architectural sight-seeing, the students were impressed by the food and the Swedish students' grasp of English. They saw Asplund's extension to the Town Hall, Eriksson's Concert Hall and the new building for the School of Architecture. On the journey to Stockholm they found the electric railways most efficient in spite of the guard's attempts to discourage sleeping in the luggage racks. They were met by a party of students, bright and energetic, although the hour was 6.30 a.m. Here they experienced the almost limitless hospitality of the Swedes, visiting a great number of buildings including, of course, the Town Hall.

The gratitude of the party is expressed to Mr. F. S. Bolland and to Mr. Tony Walton, who led the party.

Swedish Students in the West Country

During the latter half of the summer vacation members of the Bristol Centre of Arch.S.A. (R.W.A. School of Architecture) helped to entertain a party of Swedish students visiting England as the guests of the British Council. The Bristol students accompanied the Swedes in the capacity of personal hosts and succeeded in getting on excellent terms with their guests. Particularly noteworthy were the Welcome Supper on 18 August and the final party on the 30th.

Scottish Students

Glasgow students have enthusiastically begun the new session with a formidable programme of addresses by architects of national and local prominence. Talks are to be given by E. Maxwell Fry [*F.*] and Olaf Stapledon and five local architects will exhibit projects and are willing to be " quizzed " about them by the students. Arch.S.A. was able to help them in making contact with prospective lecturers. This activity augurs well for the future of the Scottish region of Arch.S.A.

London

The Arch.S.A. Council meeting will be held in London in December and a joint meeting of Council members with the Mars Group is being arranged to follow it. The Regent Street " Poly " is still exploring every avenue with the utmost energy to find accommodation for the next Arch.S.A. Congress; at present they have all proved to be *cul-de-sacs*. Anyone who knows where 150 students might be able to stay for a week in London is asked to communicate with Brian Kenchington at the Poly. without delay.

International Re-union

Mr. F. Kahn visited the meetings of the I.R.A. as observer for the Arch.S.A. and the Architectural Section of the newly formed International Union of Students. He told the Re-union that architectural students of the world had already formed an International Organisation, asked in what way they could best fit in with the proposals of the Re-union and offered the co-operation of students with their seniors. Professor Holford [*A.*] said it was most necessary for the new organisation to have the help of students all over the world and that the new Secretariat would be able to find many things for students to do. The Conference accepted with cordiality the students' offer.

Huts at the A.A.

The Architectural Association has dealt with the problem, common to all schools and universities, of accommodating ex-service students, by erecting huts. As soon as it became apparent that the number of students was likely to be at least 50 per cent. more than the existing premises could hold, the A.A. Council started a hunt for accommodation. The acute shortage of rentable floor space in central London soon revealed the impossibility of finding another building. After some weeks of fruitless effort in this direction, a short lease of a bombed site at the back of the school was negotiated. Three huts were erected; the largest—a Nissen type—is used as a studio and holds 120 students, while two Ministry of Works standard huts form a lecture room, a staff room, lavatories and stores; all are inter-connected so that the year occupying them is more or less self-contained. At the same time the huts are near enough to the main building to allow the students to use the library, restaurant, etc.

The photograph on this page shows the large studio. It is lined with wallboard, has a pitch mastic floor and is heated by suspended electric radiant panels. The studio seems to be generally approved by the students who say it is more quiet than the studios in the main building and has better daylighting. The quietness is probably due to the fibreboard lining, which, incidentally, is treated with a flame retardant paint.

The usual difficulties with permits and supply of materials were experienced. At one time there was a serious delay in the delivery of the corrugated steel sheeting, but eventually the buildings were got ready just in time for the opening of the school year. The A.A., which is now approaching its centenary year, has managed to accommodate the largest number of students in its history—four hundred and fifty.

Jubilee of the Northern Polytechnic

A beautifully produced booklet, recently received in the JOURNAL offices, draws attention to the fact that this is the Jubilee year of the Northern Polytechnic. In 1892 Queen Victoria approved the Foundation Scheme which was drafted by a committee comprising representatives of the boroughs of Hackney, Islington, Stoke Newington and St. Pancras.

Classes in architecture, surveying and building began when the building was opened in 1896. Efforts to establish a full-time School of Architecture were first made in 1911, but did not come to fruition until numbers of ex-service men were admitted to full-time courses in architecture, surveying and building after the 1914-18 war. In 1925 the work of the School of Architecture had reached so high a standard that the R.I.B.A. granted recognition of the three years' full-time course. The Evening School was similarly recognised in 1932, being the first evening school of architecture in the country to receive this distinction. The five years' course was established in 1938 and was recognised by the R.I.B.A. in 1940. In 1930 a student of the Northern Polytechnic was awarded the Rome Scholarship.

In the building up of a school of architecture, one which is now recognised as an established institution in architectural education, the work of two men has been outstanding. The driving energy of Mr. T. P. Bennett (now Sir Thomas Bennett [*F.*]) turned a series of classes in architecture into a full-time school of a standard high enough to obtain R.I.B.A. recognition for the Intermediate. He was succeeded by Mr. T. E. Scott [*F.*], who has brought the school to its present efficiency and standing.

To return to the booklet. Among the excellent illustrations is one of students apparently hard at work on drawing boards, but which does not look quite so convincing as some others, but architectural study never was particularly photogenic. The School of Architecture, however, scores heavily with the cover design which is by Mr. J. C. Stephenson, a member of the staff.

The Northern Polytechnic has always shown tremendous activity in the social life of students. These are centred in the Northern Polytechnic Union, which has 6,000 members, of whom some 1,000 are ex-students. Within the Union are clubs and societies for cricket, football, lawn tennis, badminton and billiards, a symphony orchestra, an operatic society and a repertory company. The Polytechnic possesses its own licensed theatre and has built up a large audience clientele for its operas, plays and concerts.

PRACTICE NOTES

EDITED BY CHARLES WOODWARD [A.]

IN PARLIAMENT

House Building (Man-hours)

Asked what is the average number of men required to build, complete one standard house; how this average compares with that ruling in 1938; and whether the pre-war national estimate in the building industry, that one man should build one standard house in one year, is still applicable, the Minister of Works replied: Conditions at present are too various and unstable to enable me to quote any average figure for the man-hours required in building a house or to make a comparison with pre-war estimate. (10 October 1946.)

Flats (Conversion of Houses)

Asked whether the Government have reached any decision in regard to grants to local authorities for conversion of houses into flats; if so, what this grant will be; and whether it will be retrospective to cover houses already converted, the Minister of Health replied: I assume the hon. Member has in mind the recommendations made by the Committee on the conversion of houses. This report is still under consideration. These recommendations would involve legislation of a complex and perhaps controversial character. The immediate object of securing the maximum amount of accommodation in the meantime can, however, be secured by the use of powers which already exist for the requisitioning of houses. The cost of conversion of requisitioned premises is met by the Government. (11 October 1946.)

War Damage Payments (Reconstruction Areas)

Asked whether he would take the necessary action to see that cost-of-works payments under War Damage Regulations are made portable so that, under a town planning scheme where the local authorities refuse to allow the destroyed buildings to be re-erected on the old site, erections on new sites can benefit thereby, the Chancellor of the Exchequer replied: No, Sir. I would refer my hon. Friend to the answer I gave on 6 June last to my hon. Friend the Member for the Sutton Division of Plymouth. (14 October 1946.) Note: The answer referred to will be found in Practice Notes in the July issue of the JOURNAL.

War Damage Payments (Reconstruction Areas)

Asked whether he was aware that certain houses were destroyed by enemy action, and that owing to new construction they cannot be built on the same site; and whether, as there is no provision in the War Damage Act for payment on a cost-of-works basis for a house built on another site, he will take steps to rectify this, seeing that a 1939 value payment will not provide anything like a similar house, the Chancellor of the Exchequer replied: I would refer my right hon. Friend to my answer to my hon. Friend the Member for the Sutton Division of Plymouth on 6 June, of which I am sending him a copy (16 October 1946.) Note: The answer referred to will be found in Practice Notes in the July issue of the JOURNAL.

Wages and Costs

Asked what increase, at present rate of output, in the total cost of a local authority house, based on the average of tenders approved in recent months, it is estimated would result from an increase of 6d. an hour in the wages of craftsmen and a proportionate increase in the wages of labourers; and what would be the rent equivalent of such increase, the Minister of Health replied: Approximately £70 and 10½d. per week. (17 October 1946.)

Building Materials (Cost)

Asked the authorised increase in the cost of building materials since the original ceiling price of £1,200 for privately-built houses was fixed and what percentage increase this represents, the Minister of Health replied: Different rates of increase have been authorised for different materials at different times, and no exact figure can be obtained which will reflect the variable factors involved. I am advised, however, that increases authorised since June 1945 in the cost of materials used in a typical house may be estimated as approximately 8.5 per cent., which represents approximately 4.5 per cent. of the building cost. (17 October 1946.)

Housing (Building Cost)

Asked the estimated percentage by which building costs would increase if the recent request for an increase of 6d. per hour by building trade operatives had been granted; and whether he would reconsider his refusal to grant this increase owing to the likelihood of such an increase leading to additional production, the Minister of Works replied: Assuming no change in other costs or in output it is estimated that an increase of 6d. per hour in the basic rate of pay would represent between 6 and 7 per cent. of the total cost of a house of approximately 900 ft. super. As regards the second part of the Question, any wage application is a matter for consideration by the two sides of the industry. (18 October 1946.)

Town and Country Planning (Interim Development Powers)

Asked whether he was aware that some local authorities are using their powers under Section 3 of the Town and Country Planning (Interim Development) Act, 1943, to deprive property owners of cost-of-works compensation to which they are entitled under the War Damage Act; and if he will take steps to prevent such misuse of the section in question, the Ministry of Town and Country Planning replied: An owner of any property who is either refused permission to rebuild or granted permission for a limited period has the right to appeal to me against the planning authority's decision. The appeals so far received which relate to war-damaged property do not lead me to think that planning authorities are misusing their Interim Development powers in the way suggested. (22 October 1946.)

MINISTRY OF HEALTH CIRCULARS

182/46. 2.10.46. This Circular addressed to Housing Authorities in England refers to Circular 54/46 which said that Essential Work Orders could be applied to permanent housing on request of the local authority. This arrangement has now been cancelled by Circular 182/46 and in future the Order will only be applied to new contracts where, in order to man the job, it will be necessary to either issue directions (in the case of works to which such directions can be given) or to seek to apply the Uniformity Agreement because it would be necessary to bring men from a distance and without it subsistence allowances could not be paid. Contracts for advance preparation of housing sites and for slabbing and erection of temporary houses should be dealt with under the same conditions as are set out in Circular 54/46 and the Essential Work Orders or the Uniformity Agreement will not be applied to a site unless the Regional representatives of the Ministry of Works and the Ministry of Labour are agreed that the necessary conditions have been fulfilled. (Circular 54/46 was quoted in Practice Notes for May last.)

188/46. 8.10.46. This Circular addressed to Local and Housing Authorities in the London Civil Defence Region refers to the control of Civil building and the issue of building licences. It emphasises the need for more stringent restrictions on civil building licensing. Accordingly, in consultation with the Ministry of Works, Ministry of Labour and the War Damage Commission, the Ministry of Health have determined a total quota (in terms of monetary value) to cover local authority licences for repair and maintenance work. The quota has been sub-divided between the local authorities in the Region having regard to the volume of comparable licensing in the past and to the circumstances of individual local authorities. The quotas will operate as from 28 October 1946 and a notification will be sent to each local authority setting out their quota and other details in connection with the scheme. The Regional Director of the Ministry of Works will preside over group conferences which will include representatives of the Ministry of Health, Ministry of Labour and the War Damage Commission. The Ministry of Works will make a comparable cut in the value of licences issued by local authorities as from 28 October. Having regard to paragraph 6 of Circular 171/46 local authorities should exclude from forthcoming contracts repair of war damage any occupied houses which are already up to Serial Note No. 166 standard of comfort.

192/46. 16.10.46. This Circular issued to housing authorities in England refers to the training of apprentices on special building works. Enclosed with the Circular is a booklet issued by the Ministry of Works entitled "Apprentice Builders," which fully describes the Scheme for such training which is recommended by the Building Apprenticeship and Training Council. Further information can be obtained from the Secretary, Building Apprenticeship and Training Council, Lambeth Bridge House, S.E.1.

194/46. 16.10.46. This Circular issued to all Councils in England encloses an economy Memorandum on the use of paint in building construction and maintenance which has been prepared by the Ministry of Works in collaboration with other Government Departments.

The reason for the issue of the Memorandum is the acute shortage of linseed and other vegetable oils, which restricts the use of normal paints. It is stated that the recommendations necessitate a considerable departure from good practice and a general lowering of standards which may in some cases lead to increased maintenance costs.

The Memorandum is issued from the Ministry of Works, Lambeth Bridge House, S.E.1.

197/46. 21.10.46. This Circular addressed to housing authorities

in England deals with the disposal of stocks of materials held for the repair of war damage and are now regarded as surplus to requirements, and sets out the arrangements which have been agreed with the War Damage Commission and the Ministry of Works. Comparatively small stocks of surplus materials may be disposed of by the local authority on the best terms appropriate in the circumstances and credit for the proceeds should be given to the War Damage Commission on a current R.H.C.

200/46. 23.10.46. This Circular addressed to all local and housing authorities in the London Civil Defence Region refers to the prevention of Illegal Building Work. The Minister of Works is expanding his organisation to investigate alleged contraventions of Defence Regulation 56A. Local authorities are asked to inform the investigating officers of the Ministry of Works of possible breaches of the Regulation, addressing their communication to The Contraventions Officer, Ministry of Works (Room 16), 51 Gracechurch Street, E.C.3. The information should give the address where the work is being executed, the name of the owner of the property, the name and address of the contractor, the type of work being carried out and the names and addresses of all or some of the workmen employed.

76/46. A supplement to this Circular has been issued dealing with Steel Sheets. A new M. Form, "Form M. (Sheets)" has been introduced by the Ministry of Supply and will in future be used for all authorisations of steel sheets under 3 mm. thick and 18 in. wide or more. Existing M. Forms are only to be used for other steel and for iron castings. M. Forms not intended to permit the acquisition of steel sheets must be clearly endorsed "Not valid for the acquisition of steel sheets (under 3 mm. thick and over 18 in. wide)."

PRICE CONTROL OF BUILDING MATERIALS AND COMPONENTS

Procedure for the control of prices of building materials and components is laid down in a Statement by the Ministry of Works which has been issued by the National Council of Building Material Producers to its members. It was prepared to establish an agreed code of policy and procedure to be used by the Ministries concerned, and to be available for reference and guidance to the industry generally.

It is understood that the Statement will in due course be published through H.M. Stationery Office.

TOWN AND COUNTRY PLANNING

Interim Development

The Minister of Town and Country Planning has made a General Interim Development Order dated 7 October 1946 under section 10 of the Town and Country Planning Act, 1932.

This Order revokes previous Orders, but is in the same terms as the Provisional Order dated 1 February 1946.

The Order gives power to an Interim Development Authority to give a Direction that application must be made for the development if the Authority is satisfied that having regard to the proposed development in the area, it is expedient to give such a Direction. The Authority may, however, set a cost limit on work in connection with the rebuilding or restoration of war damaged property or for alterations or maintenance work to buildings, and providing that the cost does not exceed the limit specified, the work may be undertaken without an application for permission, subject to the terms of the Order. The Corporation of the City of London have given such a Direction giving a cost limit of £300. Above this amount application must be made for development.

Enquiries should be made of the Interim Development Authority to ascertain whether in any area a cost limit has been specified in cases where it is desired to deal with war damaged property or carry out works of maintenance.

The original General Interim Development Order which this Order replaces was epitomised in Practice Notes in the JOURNAL for May 1945, and the subsequent Order was referred to in Practice Notes in the March 1946 issue of the JOURNAL. Those Notes can be read in conjunction with the new Order. It is published by H.M. Stationery Office (S.R. & O. 1946, No. 1621, Town and Country Planning, England and Wales, Interim Development).

TOWN AND COUNTRY PLANNING

The Minister of Town and Country Planning has issued a Direction under section 6 of the Town and Country Planning (Interim Development) Act, 1943, that in applications to an Interim Development Authority for permission to develop land by winning and working any minerals specified in the Direction, the Minister shall be furnished with copies of any plans and maps submitted with such applications (S.R. & O. 1946, No. 1585, Town and Country Planning, England and Wales).

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

An Interim Memorandum on District Heating has been published by H.M. Stationery Office, price 3d. This is the first official pronouncement on the subject to be made by the District Heating Sub Committee of the Heating and Ventilation (Reconstruction) Committee of the Building Research Board.

PROFESSIONAL CHARGES

REQUISITIONED LAND AND WAR WORKS ACT, 1945, SECTION 4 (3). COMPENSATION (DEFENCE) ACT, 1939, SECTION 2 (1) (*a*).

Government Departments are authorised to make contributions towards surveyors' fees where such fees are reasonably and necessarily incurred by claimants for increased compensation under section 45 of the Requisitioned Land and War Works Act, 1945. The following is the scale :—

For preparing claims and negotiating increased compensation, five guineas per cent. on the first £600, and 2½ guineas per cent. on the residue, of any annual increased agreed. Minimum fee, two guineas.

Provided that :—

(i) the contribution shall not exceed the amount which would have been allowed on the normal scale in respect of an ordinary settlement under section 2 (1) (*a*) of the Compensation (Defence) Act, 1939, at the revised figure.

(ii) where no surveyor was engaged in connection with the original claim under section 2 (1) (*a*) of the 1939 Act, a contribution towards fees may be entertained on the normal 2 (1) (*a*) scale based on the total annual compensation agreed, to the exclusion of fees on the scale applicable to a claim under section 45 of the Requisitioned Land and War Works Act, 1945.

Where a claim for an increase in compensation is made but is not allowed, no contribution towards surveyors' fees will be made.

Note : The normal scale referred to above is : Five guineas per cent. up to £300 of the annual rental value as settled, and two and a half guineas per cent. on the residue ; minimum fee, two guineas.

MINISTRY OF WORKS CIRCULARS

Building Materials Prices

The following increases and decreases of maximum selling prices are announced by the Ministry of Works :—

Metal Windows : 7½ per cent. increase on the list selling prices of standard metal windows and doors as from 25 September 1946. The extra charge for galvanising has been increased by 1½ per cent. to 17½ per cent. as from the same date.

Cornish Slates : 7½ per cent. increase on current selling prices as from 10 September 1946.

Aluminous Cement : The ex-works selling price of cement manufactured by the Aluminous Cement Co., Ltd., has been reduced by 15s. to £11 per ton as from 26 September 1946.

Nautilus Flue Blocks : The selling price of these blocks has been reduced by 10 per cent. on all dispatches from 1 October 1946.

Building Materials Prices

This Circular R.I. 73 (No. 116/46) authorises maximum selling prices of bricks, in accordance with S.R. & O. quoted below.

The increases are as follows :—

6d. per thousand for common building bricks in the United Kingdom (This is in consequence of a rise in fuel costs).

A total increase of 5s. 3d. per thousand for shale stiff plastic pressed bricks and shale wire-cut bricks produced in an area called the South Lancashire Area.

An increase of 66 and two-thirds per cent. over the 1939 charge for stacking bricks.

The Order also fixes a range of prices for concrete bricks in areas in which prices were not previously controlled.

A schedule specifying minimum and maximum ex-works prices per thousand for common building bricks of defined sizes produced in the area to which the Order applies, is attached to the Order.

S.R. & O. 1946, No. 1692 : The Bricks (range of prices) (No. 1) (Third Amendment) Order, 1946.

S.R. & O. 1946, No. 1693 : The Bricks (range of prices) (No. 2) (Second Amendment) Order, 1946.

NEW TOWNS ACT, 1946
CIVIL AVIATION ACT, 1946

These two Acts are analysed in the Journal of the Royal Institution of Chartered Surveyors for October 1946. The Final Report of Lord Reith's New Towns Committee is also considered.

The Journal also contains a reprint of Ministry of Health Circular 91/46 which deals with compensation under Part II of the Town and Country Planning Act, 1944. This is in connection with the compulsory acquisition of land for Public Purposes.

BOOK REVIEWS

Ministry of Works (Post-War Building Study No. 18.)
The Architectural Use of Building Materials, by a Committee convened by the R.I.B.A. 4to. pp. 91. London. H.M.S.O. 1946. Price 2s. 6d.

REVIEWED BY G. FAIRWEATHER [*F.*]

This Report is the work of a Committee convened by the R.I.B.A., and is in effect an appraisement of the materials of architecture. The Committee was instructed to deal primarily with the æsthetic aspect of the use of materials, and although this point of view has been taken, it was found, in the words of the Committee, "that technical and scientific matters necessarily intruded."

The Committee reports at length and with obvious enthusiasm for the traditional materials and crafts. The æsthetic merits and durability of stone, brick, slate, tile and timber, earn high praise; and sound advice about the problems of their selection and use is offered to designers.

The treatment of the newer materials is brief and reads more like a catalogue of information than an appraisement. In view of the fact that we still have very little experience of the use of many of the newer materials, this scant treatment may well be justified. Nevertheless one wonders whether the Committee has succeeded in giving a really comprehensive review of the subject after reading the following extract from the Introduction :—

> "The newer materials have been considered as well as the old, and it is realised that the artistic standards of the new may differ from those of the old. Some of the newer materials and some of the older, such as wood, in their newer adaptations, possess a lightness or toughness, a sense of surface resistance, a beauty of function rather than the more contemplative effects of massive brickwork or masonry. But the conclusion has been reached that no new material or substance has arisen to challenge seriously the beauty and durability of the traditional building materials of Britain, be they stone, brick, slate, tile, or timber."

The artistic standards of the new architecture cannot be compared with the standards of "contemplative" artistry achieved in the architecture of earlier times. Present day civilisation requires a higher standard of comfort than was attainable by earlier generations, and demands a more generous dispensation of these higher standards.

New materials come into use because there is a need for them, and not as a challenge to the old. They have a rightful place in the architecture of our time, but we must learn how to improve them, and how to use them.

Ministry of Works (Post-War Building Study No. 23.)
House Construction (Second Report), by an Inter-Departmental Committee appointed by the Minister of Health, the Secretary of State for Scotland and the Ministry of Works. 4to. pp. 68. London. H.M.S.O. 1946. Price 1s. 6d.

REVIEWED BY G. FAIRWEATHER [*F.*]

This Report has been prepared by an Inter-Departmental Committee appointed by the Minister of Health, the Secretary of State for Scotland and the Minister of Works. It is concerned entirely with the expected behaviour of nine houses built experimentally by new methods of construction, and judges them against the standards indicated in the First Report (generally known as the Burt Report).

Generally, the findings of the Committee are favourable to the nine types of houses reviewed, although in some cases it has been found that the standards recommended were higher than can be reasonably demanded in the circumstances prevailing at the present time. On the other hand, it has been found that certain standards considered high for houses of traditional construction can be met with comparative ease by the employment of new constructional methods and materials.

Each of the nine types is amply explained by notes, diagrams and photographs. The criticisms and suggestions are clearly set out, and the whole work should prove a very useful guide to anyone faced with the problems of using alternative methods for house construction.

Building Specifications. T. Sumner Smith, F.S.I., F.I.Arb. 4to. pp. 192. Hutchinson's Scientific and Technical Publications. London. 1946. Price 16s.

REVIEWED BY H. J. VENNING.

Mr. Sumner Smith's book can be recommended particularly to young architects and those studying professional practice for their examinations and later. Its aim is to show how to set about writing the specification in a commonsense way, and how to keep it in balance with the other contract documents.

A good sound book and a really useful addition to the books on this subject. It comes under the Professional Practice class rather than the reference or data book division.

Building and Public Works, Administration, Estimating and Costing. Spence Geddes, E.S. Diplomate, R.T.C. Glasgow. 4to. pp. 268. George Newnes, Ltd. London. 1946. Price 25s.

REVIEWED BY H. J. VENNING.

This book relates almost wholly to site works, that is roads, sewers, water mains and services, such as are commonly carried out by a public works contractor and indeed are very much in evidence just now as advance preparation of housing sites. The author, an experienced public works contractor, has made available a great deal of information and set it out most clearly. Even though experts may not agree on the "constant of labour" for every item, the value of such a book cannot be doubted. I should think that any public works man would be unwise if he does not get this book.

The author gives some constants of labour, etc., for building operations such as might fall to the public works side, but this does not purport to be a book of building prices.

Costing of "architectural" building items has been considered a great deal recently, and will, when the time comes, require a very large volume indeed; but that remark does not detract for a moment from the value of this book in its own field.

Woodfall's Law of Landlord and Tenant: Cumulative Supplement No. 5. 4to. pp. (xv) + 219. Sweet & Maxwell; Stevens & Sons, Ltd. 12s. 6d.; postage 4d.

This is the Fifth Cumulative Supplement to the 24th edition, by Lionel Blundell, and brings the work up to June, 1946. This *Law of Landlord and Tenant* is so well known that it needs no commendation.

Domestic Heating in America. Ministry of Fuel and Power and the Department of Scientific and Industrial Research. 4to., x+152 pp. London. H.M.S.O. 1946. 3s. net.

In the winter of 1944-45 a joint party from the Ministry of Fuel and Power and Building Research Station and Fuel Research Station of the Department of Scientific and Industrial Research spent three months studying heating, cooking and hot-water supply in small houses in the U.S.A. and Canada. Their report has now been published by His Majesty's Stationery Office and gives a comprehensive picture covering climatic conditions, fuel resources and costs, head demand, distribution sale and maintenance of appliances, the relationship of heating to house planning, smoke abatement, descriptions of heating, cooking and water heating appliances, chimneys, heat insulation, research work and consumer reaction.

Although American heating systems are not directly applicable in this country, a study of the methods of that country gives valuable information on how to achieve efficiency combined with economy.

Northern Ireland Housing Trust. First Annual Report 1945-1946. 4to. pp. 24, plates 6. Belfast. H.M.S.O. 1946. Price 8d.

REVIEWED BY H. BRADDOCK [*A.*]

In this Report we are presented with a simple story of high endeavour and encouraging progress in the provision of houses in Northern Ireland.

So simple and straightforward is the account that it takes in its stride a welcome "tightening up" of the meaning of the term prefabricated.

It is interesting to note that the published layout plans all show one policy in the provision of a fairly ample area of land as open space within the site area.

It may be felt on examination, however, that there is a lack of imagination in the interpretation of this general policy and the writer felt a distinct coldness and rigidity in the handling of this feature in those layouts which are illustrated.

Pamphlets on The Care of Churches. No. IV—The Care o Monumental Brasses and Ledger Slabs, by R. Griffin, revised by R. H. D'Elboux, Central Council for the Care of Churches. 4 pp. Press and Publications Board of the Church Assembly. London. 1946. 4d.

This pamphlet is No. IV in the series on the care of churches. Only a few pages in length, it contains valuable advice on the proper treatment of memorial brasses. These are often damaged not only by thoughtless restorers, but also as a result of misguided attempts to clean and protect. Further information on the subject may always be obtained from the Monumental Brass Society, c/o The Society of Antiquaries of London, Burlington House, W.1.

Works of Art in Germany (British Zone of Occupation). pp. (v) + 66. 2s. 6d.

Works of Art in Greece. pp. (ii) + 64. 2s.

Works of Art in Malta. pp. (v) + 48. 2s.

Losses and Survivals in the War Series. British Committee on the Preservation and Restitution of Works of Art, etc. His Majesty's Stationery Office.

REVIEWED BY ADRIAN JONES.

These three admirable publications make sad reading indeed, but they are more than just well-illustrated and well-produced catalogues of destruction. These careful and straightforward lists are a more eloquent reproach than the most impassioned rhetoric.

Against the name of each city and village is described what is irretrievably lost, what is repairable and what has been saved. What has been saved, by the erection of blast walls and the evacuation of movable works of art to remote *caches*, is more than one had dared to hope, particularly in Western Germany where ancient and venerable cities were subjected to the most appalling battering any country has ever known. Except for the dive-bombing of Floriana Church by the Germans and the deplorable behaviour of the Bulgars, who "extended their policy of rooting out the Greek population of this area (Eastern Macedonia, Thrace and the Islands of Thasos and Samothrace) to the monuments of ancient Greek civilisation," there appear mercifully few cases of malice aforethought. In the Axis zones of occupation the Germans, Italians and Bulgars seem to have run more or less to type. The Germans careful, at times scholarly, but acquisitive; the Italians careless, and the Bulgars as barbarous as their forefathers for whom this word was coined. The Allies had no zones of occupation, but only targets for attack so that, stone for stone, the damage caused by the Allies is immeasurably greater than that caused by the Axis. In fact, within the scope of these reports, the only place in any way comparable to Western Germany where the damage can be laid to the count of the King's enemies is the small area round the Royal Dockyard in Malta where the Three Cities—Vittoriosa, Senglea and Cospicua—were smashed to rubble.

The volume on Malta, besides cataloguing the damage, provides much useful information about the architecture of this little known island. It cannot be too strongly stressed that Malta is not only a fortress but a priceless repository of Renaissance architecture and, as well as possessing the most splendid extant examples of fortification in the grand manner, boasts of very important prehistoric remains. This aspect of Malta tends to be forgotten and is almost ignored by the Naval and Military authorities who appear to use their almost unlimited powers in rather a high-handed way. Several interesting monuments were ruthlessly destroyed during the war to make way for air-strips and the *Auberge de Castille*, a magnificent palace of the 18th century and probably the finest secular building in Valletta, a city remarkable for its fine buildings, is being rebuilt by the Royal Engineers without either skilled supervision or the advice of an architect. The report rightly deplores this procedure and also hopes that the Royal Navy, without interfering with the efficient working of the Royal Dockyard, may preserve "the architectural aspect of the famous waterfront" of Vittoriosa. It is to be feared that unless prompt and vigorous action is taken "at the highest level" these hopes will be dashed to the ground by the ignorance and *désinvolture* of the Services.

It is a relief to read that Aachen Cathedral escaped comparatively lightly, that the Carolingian polygon is structurally intact and the Treasure safe; that the palace of Brühl is not irreparably damaged, and that although Cologne Cathedral suffered considerably from its proximity to the Railway Station, the shrine of the Magi and much of the Treasure is intact. Also of Lübeck that "enough of this ancient and beautiful city remains to preserve a character that is unique among the cities of Europe."

In Greece, Athens has hardly a scar and the Parthenon, although hit, has sustained negligible harm. Mycenae, Olympia and Tiryns are virtually untouched, but although Mount Athos is unscathed, the monasteries of Meteora suffered by pillage and bombardment and the remains of the buildings of the Knights of Saint John on the islands of Cos and Rhodes have been seriously harmed. It seems the German *Referat für Kunstschütz* attempted to fulfil its purpose, but at times overriding circumstances thwarted.

The Committee on Preservation and Restitution of Works of Art and other Material in Enemy Hands is to be congratulated on its work and on the excellent style of its reports. May we hope that the energy and care which has gone to produce them will not be wasted, and that as much will be directed into the practical reconstruction and preservation of monuments which, whether they be in Germany, Greece or Malta, are our common heritage. Of the presentation no higher praise can be offered than to say that His Majesty's Stationery Office maintains the standard which we have come to expect from it.

Seventh Report of the Royal Fine Art Commission 1937 to 1945. 4to. pp. 21. H.M.S.O. London. 1946. Price 1d.

This Report is welcome as a statement on the achievements of the Royal Fine Art Commission immediately prior to and during the war years. The list of the more important events and matters dealt with since the last Report was issued is an impressive one, from postage stamps to the protection of monuments, housing prefabrication and reconstruction, post-war town planning including the City of London, Carlton House Terrace and Regent's Park, war memorials, power stations and new bridges. Advice has also been sought in connection with work abroad, including Malta and India. The items mentioned have been selected from the full list included as an appendix, of which length and variety are a clear indication of the extent to which the advice of the Commission is sought and, it is hoped, later followed.

Data Book for Civil Engineers: Specifications and Costs. Elwyn E. Seelye. $9\frac{3}{8} \times 11\frac{3}{4}$. pp. 325. Wiley, Chapman & Hall. New York; London. Price $6.75.

REVIEWED BY H. J. VENNING.

This is an American volume for Civil Engineers. It is Vol. II of a comprehensive and not unimportant series dealing with Construction (Docks, Bridges, etc.) and Building (Civil Engineering incidental to Architectural works).

Whilst there is a good deal which is of interest to us, for example, the forms of contract, etc., employed in U.S.A., its practical use in this country is naturally rather limited. The section of costs attracts one's attention in view of the comparison made from time to time between costs in U.S.A. and here. The Engineering News Record of America, quoted by the author, appears to keep an all-over record of general cost of work compared with an index of 100 in 1913. The line, or curve, appears much like our own (the rise on heavy construction being greater, and on building less, than ours). But in the States and over here there appears to be no "official" index. Judging from this volume, American costs, i.e., known costs of executed work, are not published systematically. Although some journals publish figures, the range seems to be distinctly limited, and over there, as here, the professional man relies inevitably on his own knowledge and experience. The author here has given us the available information, always better than none.

The book has every appearance of thoroughness, and is, as would be expected, exceptionally well produced.

Wall Surfaces: Ancient Usage and Modern Care, by F. C. Eeles, O.B.E., D.Litt. 8 pp. 14 illus. Central Council for the Care of Churches. Press and Publications Board of the Church Assembly. 1946. Price 9d.

REVIEWED BY W. W. BEGLEY.

This pamphlet should be filed by every architect and read by all who care for our ancient churches.

Practically all Victorian restoration of mediæval buildings was disastrous but the stripping of the original plaster from their walls stands almost at the top of the list of errors.

Not only were the interiors horribly disfigured but externally inferior rubble walling, which was never intended to be exposed, was left uncovered to the weather. As might be expected rapid decay has followed resulting, only too often, in "fancy" pointing, as illustrated in the unfortunate case of Putney Parish Church (Fig. 13).

Actually the practice is not entirely Victorian, for examples occur from time to time, even in current works, but the extensive repairs needed after bombing and the war years of deterioration, make this pamphlet particularly opportune and provide the chance to correct the misapplied zeal of the past.

The fourteen well-chosen illustrations show, not only the hideousness of the stripped interiors, as figure 10, unnamed, perhaps wisely, and figure 8, North Wingfield, Derbyshire, but also the decay of the "skinned" rubble externally.

Shelton, Bedfordshire, provides illustrations of satisfactory treatment of both interior and exterior and Monk Sherborne, Hampshire, an interesting interior, showing how architectural features may be exhibited in an otherwise properly covered wall.

The letterpress, by Dr. Eeles, is concise and very much to the point. Particularly useful hints are given as to local characteristics in the treatment of walling, and the last section, "Treatment and Remedies," although only one page contains much wisdom.

The pamphlet forms No. 3 in a series, of which No. 1 is "Lighting and Heating" (price 4d.); No. 2 is "Loudspeakers and Acoustic Problems," by Hope Bagenal, F.R.I.B.A. (price 4d.); and No. 4 "The Care of Monumental Brasses and Ledger Slabs," by R. Griffin, F.S.A. (price 4d.).

NOTES FROM THE MINUTES OF THE COUNCIL

MEETING HELD 15 OCTOBER, 1946

Membership of the Council

Under the provisions of Bye-law 28 (*g*) the following have been appointed members of Council for the Session 1946-1947 :—

Mr. D. M. Cowin [*A.*], President-in-Chief, Institute of South African Architects. Mr. H. N. Dallas [*A.*], President of the Indian Institute of Architects.

Mr. E. Berry Webber [*A.*] has been re-appointed the representative in the United Kingdom of the South African Institute, and Mr. A. J. A. Illingworth [*A.*] the representative of the Indian Institute.

The Work of the Session

The President gave a brief resumé of the programme of work which lay before the Council and the Institute generally. He also dealt with the more important items which had been dealt with during the Session which has recently ended.

The Honorary Associateship

The Secretary reported that the Rev. C. B. Mortlock, M.A., F.S.A. and Mr. E. C. Kemper, Executive Director of the American Institute of Architects, had accepted nomination as Honorary Associates.

The Honorary Corresponding Membership

The Secretary reported that Sr. Carlos Contreras (Mexico), M. Paul Tournon (France) and Professor H. Russell Hitchcock (Connecticut, U.S.A.) had accepted nomination to the Honorary Corresponding Membership.

Appointments

Building Industries National Council : Mr. C. G. Stillman (Vice-President).

Central Council for Civic Societies : Mr. A. L. Roberts (Hon. Secretary).

Council of the Central Institute of Art and Design : Mr. H. M. Fletcher [*F.*].

B.I.N.C. Building Congress : Mr. C. G. Stillman (Vice-President), Mr. A. C. Bunch [*F.*].

St. Luke Fine Arts Celebration Committee : Mr. A. L. Roberts (Hon. Secretary).

Annual Meeting of National Registration of Plumbers : Mr. C. Stanbury Madeley [*A.*].

Council of the British School at Rome : Mr. Martin S. Briggs [*F.*].

Board to be set up by War Damage Commission to advise the Commission on the employment of Consultants : Mr. P. V. Burnett [*F.*], Mr. J. Alan Slater [*F.*].

Architecture and Public Utilities Advisory Committee, Ministry of Labour and National Service : Mr. T. E. Scott [*F.*], Mr. P. G. Fairhurst [*F.*], Mr. C. G. Stillman (Vice-President), Mr. Everard Haynes, Secretary, Board of Architectural Education. In addition the Minister has appointed the Secretary of the R.I.B.A. as a member of the Committee.

B.S.I. Sub-Committee SFE/14/3, Thermal Insulating Materials of a non-structural nature for House and Factory Walls : Mr. G. Fairweather [*F.*].

B.S.I. Technical Committee HIB/20 : Rainwater Goods in Non-Ferrous Material : Mr. D. L. Medd [*A.*].

B.S.I. Technical Committee WEE/19 : Bronze Welding and Brazing : Mr. R. B. Ling [*F.*].

B.S.I. Technical Committee SAB/- : Sanitary Appliances Industry Committee : Mr. Thomas Ritchie [*F.*].

B.S.I. Committee to prepare a British Standard for Cycle Storage Racks with special reference to their use in school and factory buildings : Mr. O. C. F. Carey [*A.*].

British School of Archæology at Athens

The Council approved the resumption in 1947 of the Institute's contribution of £50 to the British School of Archæology at Athens.

Donation Governorship of Christ's Hospital

The Secretary reported that an anonymous donor, an Almoner of Christ's Hospital, had made a gift of £500 to enable him (as Secretary, R.I.B.A.) to hold a Donation Governorship of Christ's Hospital. It is proposed that presentations to the school should be made on the recommendation of the Architects' Benevolent Society.

Proposed Bequest of Books to Library

The Council were informed of the generous intention of Sir Banister Fletcher (Past President) to bequeath to the R.I.B.A. such of his library of architectural books as the Institute might select, and a message of warm appreciation was conveyed to him.

Height of Rooms

The Council approved a proposal that the Institute should join with the C.P.R.E. in urging the Minister of Health to initiate an independent scientific investigation into the desirability of reducing the minimum height of ceilings below the 8 feet at present prescribed by Bye-laws.

Membership

The following members were elected :—

As Hon. Associate 1 ; as Hon. Corresponding Members 4 ; as Fellows 13 ; as Associates 25 ; as Licentiates 16.

Election, 10 December 1946

Applications for election were approved as follows :—

As Hon. Associates 2 ; as Hon. Corresponding Members 2 ; as Fellows 13 ; as Associates 87 ; as Licentiates 31.

Election, 11 March 1947

Applications for election from Overseas Candidates were approved as follows :— As Fellows 3 ; as Associates 6.

Applications for Reinstatement

The following applications were approved :—

As Fellow : Bertrand James Waterhouse, O.B.E.

As Associates : H. T. Bromley [*Retd. A.*], Mrs. Barbara Cole, John Charles Mackenzie, Colin Ross McLean, Reginald Latham Luke, John Tenniswood Lupton, Edward Patrick Wilson. As Licentiates : Charles Vincent McLaughlin, Ernest George Wilks, Reginald Wallace Willcocks.

Resignations

The following resignations were accepted with regret :—

Mrs. Kathleen Mary Durie [*A.*], Albert Edward Dixon [*Retd. A.*], Eric Roger Welstead [*A.*].

Applications for Transfer to Retired Members' Class under Bye-law 15

The following applications were approved :—

As Retired Associates : Dennis Bamford, Clarence Spencer Picton, Kenneth Duncan Stuart Robinson.

As Retired Licentiates : Frederick Charles Ellis, George Nathaniel Kent, Frank Rice White.

Obituary

The Secretary reported with regret the death of the following members and Students :—

William Thomas Creswell, K.C. [*Hon. A.*].

Sir Henry Frank Heath, G.B.E., K.C.B. [*Hon. A.*].

Antonio do Couto [*Hon. Corresponding Member*].

John Edward Bladon [*F.*].

Fred Broadbent [*F.*].

Thomas Edgar Eccles [*F.*].

Mr. Eccles was a Past President of the Liverpool Architectural Society and had represented that Society on the Council.

Thomas Jackson Hill [*F.*].

Sir Matthew Montgomerie Ochterlony, A.R.S.A. [*F.*].

Geoffrey George Phillips [*F.*].

Ingalton Sanders [*F.*].

Mr. Sanders was a Past President of the Hampshire and Isle of Wight Architectural Association and had represented that Association on the Council and the Allied Societies Conference. He was also a past Vice-President.

Melville Seth-Ward [*F.*].

Gerald Unsworth, M.C. [*F.*].

Alfred Morris Butler [*Retd. F.*].

Henry Alfred Cooper [*Retd. F.*].

William Henry Herbert Marten [*Retd. F.*].

Stanley James May [*Retd. F.*].

Herbert Norman [*Retd. F.*].

Mr. Norman was a past President of the Northamptonshire, Bedfordshire and Huntingdonshire Association of Architects.

James Smith [*Retd. F.*].

Miss Betty Christine Benson [*A.*].

Thomas Inglis Goldie [*A.*].

Henry Pynor [*A.*].

Frederick Williamson [*A.*].

Frederick Musto [*Retd. A.*].

Percy John Black [*L.*].

Ernest Frost [*L.*].

William Stephen Gibson [*L.*].

Maurice Peter Holmberg [*L.*].

John James Lee [*L.*].

John Norman Lewis [*L.*].

James Meldrum Mitchell [*L.*].

James Percival [*L.*].

Alexander Young [*L.*].

Evan Roberts [*Retd. L.*].

Tom Wadkin Bevan [*Student*].

Derek Hugh Claye [*Student*]. Killed on active service.

Anthony George Edward Howard [*Student*].

Albert Thomas Newton [*Student*]. Killed on active service.

MEMBERSHIP LISTS

The following candidates for membership were elected on 15 October 1946 :—

AS HONORARY ASSOCIATE (1)

WHISKARD : Sir Geoffrey Granville, K.C.B., K.C.M.G., Hon. LL.D. (Melbourne), Mildenhall, Suffolk.

AS HONORARY CORRESPONDING MEMBERS (4)

LAURITZEN : Vilhelm Theodor, Copenhagen.
ONAT : Emin, Istanbul.
RASMUSSEN : Steen Eiler, Rungsted Kyst, Denmark.
VAGO : Pierre, Paris.

AS FELLOWS (13)

BATHURST : Leslie John [*A.* 1922].
BLACKBURN : Jack, Dip.T.P., A.M.T.P.I. [*A.* 1938], Old Hill, Staffs.
CAHILL : Mrs. Mary Proctor [*A.* 1934], Newcastle-on-Tyne.
CAHILL : Thomas Joseph, B.A. [*A.* 1934], Newcastle-on-Tyne.
HARRISON : Edward James, B.Arch. [*A.* 1932], Edinburgh.
KING : William Henry [*A.* 1929], Leeds.
SANDERS : Maurice [*A.* 1934].
SOMAKE : Ellis Edward (Sqdn. Ldr. R.A.F.V.R.) [*A.* 1930].
SOMJEE : Habib Jusabbhoy Alladinbhoy, B.A., Dip. Arch. (Lond.) [*A.* 1936], Bombay.
TATCHELL : Rodney Fleetwood [*A.* 1932].
WESTON : Norman Ernest Godfrey [*A.* 1936], Sheffield.
WORTHINGTON : Thomas Shirley Scott [*A.* 1927], Manchester.

And the following Licentiate who has passed the qualifying examination :—

DALE : Bernard Henry, Southampton.

AS ASSOCIATES (25)

ADDISON : Alexander Joseph.
BHALLA : Jai Rattan, Bombay.
CANDIOTES : George, Dip.Arch. (Rand), Germiston, South Africa.
CLARK : Reginald William, Oakham.
CUZENS : Gerald Johns, Lincoln.
DODD : Walter Duncan Middleton, Heswall.
ENGLESMITH : George, B.Arch.
HARVEY : Mrs. Margaret Elizabeth Dingwall, Birmingham.
HARVEY : Robert Henry, Birmingham.
HEATON : Robert Barclay, B.Arch., West Kirby.
HOLLAND : Frank Wolstenholme.
KHWAJA : Zahir-ud-Deen, Nabha, India.
KNAPTON : Alan Derek.
JENKINS : John Tamplin, Kenilworth, Cape.
MEHTA : Noshir Naoroji, Bombay.
NIEBUHR : Richard Lodewyk, B.Arch.(Rand), Johannesburg.
OVERALL : John Wallace, Sydney.
PRISSMAN : Benjamin, B.Arch.(Rand), Johannesburg.
REYNOLDS : Roderick Barker, Cape Town.
ROGERS : Vernon William.
SAMARASEKERA : Agampodi Justin Victor de Zoysa, Colombo.
SILCOCK : Raymond.
SPOONER : Peter, Sydney.
TACON : Ivor Charles Russell, Fairfield, N.S.W.
WAGG : Donald, Peterborough.

AS LICENTIATES (16)

ALLEN : Leonard Clifford, Leicester.
BAIRD : Graham Scott, Budleigh Salterton.
BEILBY : Leslie George, York.
COSEDGE : David Ernest.
CURTIS : John.
GAINSFORD : Alan Peter.
GEORGE : Alfred, Merthyr Tydfil.
GRIFFITHS : John Morgan Gordon, Tenby.
KAY : Thomas Stephen, Stafford.
KING : John Clifford, Sleaford.
MUIR : Charles Robertson, Paisley.
POWELL : Thomas Leonard, Northampton.
SLADE : Arthur.
STOTT : Hugh Ronald, Stockport.
WALLER : Charles Ashton.
WILKINSON : William Currington, Peterborough.

ELECTION : 10 DECEMBER 1946

An election of candidates for membership will take place on 10 December 1946. The names and addresses of the candidates, with the names of their proposers, found by the Council to be eligible and qualified in accordance with the Charter and Bye-laws, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Monday, 9 December.

The names following the applicant's address are those of his proposers.

AS HONORARY ASSOCIATES (2)

KEMPER : Edward Crawford, Executive Director, The American Institute of Architects ; 5615 Grove Street, Chevy Chase, Md., U.S.A. Proposed by the Council.

MORTLOCK : The Rev. Charles Bernard, M.A. (Cantab), F.S.A. The Vicarage, Epping, Essex. Proposed by the Council.

AS HONORARY CORRESPONDING MEMBERS (2)

CONTRERAS : Carlos, Edificio La Nacional 1004, Avenida Juarez 4, Mexico City, Mexico. Proposed by the Council.

TOURNON : Paul, Architecte en chef des Batiments Civils et Palais Nationaux, Directeur de l'Ecole Nationale superieure des Beaux Arts, Membre de l'Institut, 87 Boulevard Saint Michel, Paris V. Proposed by the Council.

AS FELLOWS (13)

BENIANS : Hubert Joseph [*A.* 1911], Little Brandfold, Goudhurst, Kent. C. H. Strange, L. H. Keay and Cecil Burns.

CLARKE HALL : Denis [*A.* 1936], 29 Sackville Street, W.1. ; 2 Selwood Terrace, S.W.7. F. R. S. Yorke, Frederick Gibberd, and Richard Sheppard.

CLAYTON : Gerald Rupert [*A.* 1920], Deputy County Architect, Durham County Council, Shire Hall, Durham ; "Dale Crest," The Peth, Nevilles Cross, Durham City. F. W. Harvey and applying for nomination by the Council under the provisions of Bye-law 3 (*d*).

COOTE : Lionel Francis Russell [*A.* 1929], The Old Cottage, Bladon, Oxford. Maurice Chesterton, R. F. Dodd and Prof. Sir Patrick Abercrombie.

COVELL : Ralph George [*A.* 1935], 5 Mitcham Road, S.W.17 ; 35 Keswick Road, Putney, S.W.15. W. F. C. Holden, O. Campbell Jones and G. W. Knight.

GOLDFINCH : Donald Albert [*A.* 1938], City Architect's Office, Priestly House, Quarry Hill, Leeds. Lieut.-Col. R. F. Gutteridge, L. S. Stanley and Sir George Oatley.

GREEN : Maurice Sydney [*A.* 1934], 10 High Street, Totnes, Devon ; Hay Hill, Totnes. J. P. Grant, H. O. Hamilton and Charles Nicholas.

HILL : John James [*A.* 1936], 28 East Park Terrace, Southampton ; "Kirkstone," Glenfield Avenue, Bitterne, Southampton. J. S. Kelsall, Terence Carr and A. M. Chitty.

ROWE : Harold Bertram [*A.* 1925], City Architect, Municipal Offices, Exeter ; 14 Velwell Road, Exeter. Johnson Blackett, C. F. Bates and F. S. Swash.

TOMKINS : Cyril James [*A.* 1930], Deputy City Architect, City Hall, Norwich ; 73 Grove Walk, Norwich. L. G. Hannaford, T. C. Howitt and F. H. Swindells.

WYLSON : John Duncan, A.A.Dip [*A.* 1936], 8 Caroline Place Mews, Bayswater, W.2. David Stokes, S. R. Pierce and J. M. Easton.

And the following Licentiates who are qualified under Section IV, Clause 4 (*c*) (ii) of the Supplemental Charter of 1925 :—

SHARP : Adrien Jouvin, 1 Western Parade, Southsea ; 6 Burbidge Grove, Southsea. V. G. Cogswell, Ernest Bird and A. L. Roberts.

SURRIDGE : Henry Ralph, Bank Chambers, Kettering ; 50 Blandford Avenue, Kettering. Charles Riddey, F. H. Allen and F. J. Lenton.

AS ASSOCIATES (88)

The name of a school or schools after a candidate's name indicates the passing of a recognised course.

ADAMSON : Hamish Edgar Donald [Final], 66A Church Crescent, Muswell Hill, N.10. H. E. Mathews, W. H. Ansell and O. D. Pearce.

ADAMSON : Joseph William [Special Final], 15 Longley Road, Almondbury, Huddersfield. J. R. Piggott, Clifton Edwards and J. B. Adams.

AITCHISON : Robert (Glasgow Sch. of Arch.), 22 Strowan Street, Sandyhills, Tollcross, Glasgow, E.2. W. J. Smith, William McCrea and J. A. Coia.

ALLISON : James Paterson, M.A., B.Sc. (Glasgow Sch. of Arch.), 7 Hill Street, Irvine, Ayrshire. W. J. Smith, T. H. Hughes and John Armour.

ASLAN : Naim Jacob (Liverpool Sch. of Arch., Univ. of Liverpool), 9 Matheson Road, West Kensington, W.14. Prof. Sir Charles Reilly, Prof. L. B. Budden and Prof. Sir Patrick Abercrombie.

BARLOW : LEONARD ROBERT [Final], 32 Milwall Place, Sandwich, Kent. H. C. Ashenden and applying for nomination by the Council under Bye-law 3 (*d*).

BEARD : PHILIP [Special Final], 47 Headland Park, Plymouth. H. T. Jackson, F. J. Taylor and F. H. Allen.

BEERS : JAMES HAROLD [Special Final], 53 Serpentine Road, Whitewell, Belfast. R. H. Gibson, T. W. Henry and T. R. Eagar.

BETHA : RICHARD MORLAND [Final], 3 Raymond Buildings, Gray's Inn, W.C.1. F. M. Harvey, L. T. Moore and Douglas Wood.

BROADHEAD : GORDON LESLIE (Univ. of Sheffield, Dept. of Arch.), 27 Waverley Road, Southsea. G. T. Harman, S. W. Ackroyd and P. B. Dannatt.

BROOKE : JOHN RICHARD PETER (Arch. Assoc. (London)), 36 Parkfield Crescent, Feltham, Middlesex. J. T. W. Brooke, J. H. Markham and Prof. A. E. Richardson.

BURGIS : NORMAN LESLIE SEWELL [Special Final], 78 Hillside, Brighton, 7. K. E. Black, H. S. Goodhart-Rendel and D. W. Rowntree.

CHAN : HTYAN HOE (Arch. Assoc., London), 56A Comeragh Road, Baron's Court, W.14. George Fairweather, D. F. Martin-Smith and R. E. Enthoven.

CHEETHAM : JAMES HAROLD [Final], 11 Gaskell Street, Stockton Heath, Warrington, Lancs. Geoffrey Owen, F. J. M. Ormrod, and Harry Banister.

CLARK : JOHN ALEXANDER [Special Final], 17 Woodberry Avenue, Winchmore Hill, N.21. L. H. Bucknell, C. M. Swannell and J. B. F. Cowper.

CLARK : JOHN FORBES, D.F.C. (Liverpool Sch. of Arch., Univ. of Liverpool), "Upways," Stone Lane, Kinver, near Stourbridge, Worcs. Prof. L. B. Budden, Donald Brooke and J. E. Marshall.

CLARKE : JOSEPH EDMUND (Capt.) [Special Final], c/o 1 Bellevue Road, Carnalea, Co. Down, N. Ireland. J. R. Young, R. G. Hopcraft and T. W. Henry.

CLAYDON : BERNARD [Special Final], 82 Lonsdale Road, Smithills, Bolton. A. J. Hope, R. M. McNaught and J. P. Nunn.

CLIFFORD-TURNER : HARRY DUDLEY (Univ. of London, Bartlett School of Arch.), 21 Porchester Place, W.2. Prof. A. E. Richardson, Prof. H. O. Corfiato and C. L. Gill.

CONNELL : HUGH CAMPBELL, B.Sc.(Arch.) (Glasgow Sch. of Arch.), 2 Bedford Street, Chorley New Road, Bolton, Lancs. W. J. Smith, A. J. Hope and R. M. McNaught.

CONNOR : GEORGE STANLEY WORDSWORTH (Leeds Sch. of Arch.), "Beechcliffe," 7 Kirkstall Mount, Leeds, 5. P. M. Andrews and applying for nomination by the Council under Bye-law 3 (*d*).

CUNNINGHAM : RONALD THOMPSON [Special Final], 30 Clyde Street, Cliftonville, Coatbridge, Lanarkshire. L. W. Hutson, Jos. Weekes and Col. J. M. Arthur.

DAVEY : FREDERICK WILMOT [Special Final], 12 Sion Row, Twickenham, Middlesex. L. M. Gotch, S. C. Ramsey and T. E. Scott.

DAWSON : HENRY DEARLE [Special Final], Town Planning Department, Town Hall, Brighton. K. E. Black, S. H. Tiltman and F. F. Howard.

DIXON : JOHN CULLEN (Leeds Sch. of Arch.), 4 Holt Close, Adel, Leeds, 6. Applying for nomination by the Council under Bye-law 3 (*d*).

DODDS : KENNETH [Special Final], 51 Rokeby Drive, Gosforth, Newcastle-on-Tyne, 3. R. G. Roberts, R. N. Mackellar and W. Tweedy.

DOLAN : Miss MARY ETHNA (Univ. Coll. Dublin, Sch. of Arch.), 24 Nassau Street, Dublin. Prof. J. V. Downes, H. J. Lyons and Vincent Kelly.

DOLMAN : MOWBRAY [Special Final], 10 St. James' Court, Croydon, Surrey. Graham Crump, C. G. Butler and A. D. Sayers.

DORAN : PATRICK JOSEPH (Liverpool Sch. of Arch., Univ. of Liverpool), 5 Vivian Gardens, Wembley, Middlesex. Prof. Sir Charles Reilly, Prof. L. B. Budden and Prof. Sir Patrick Abercrombie.

ELLIOTT : LEONARD WILLIAM [Final], 50 Eton Hall, N.W.3. Sir Thomas Bennett, C. J. Mole and Raglan Squire.

ELLIOTT : RAYMOND FOSTER [Final], Bridge Cottage, Dorking Road, Leatherhead, Surrey. W. B. Sinclair, E. S. Underwood and C. W. Box.

FLEMING : GEORGE WILSON (Glasgow Sch. of Arch.), c/o Mrs. McIver, 30 Glover Street, Craigie, Perth. W. J. Smith, C. G. Soutar and Wm. Salmond.

FRENCH : WILLIAM JOHN (Edinburgh Coll. of Art, Sch. of Arch.), 42 Mauchline, Nr. Linlithgow, West Lothian. C. E. Tweedie, A. H. Mottram and J. R. McKay.

GODDARD : FREDERIC WALTER [Special Final], 12 Mayfield Gardens, Edinburgh, 9. W. A. Ross, A. A. Foote and John Wilson.

GOUGH : JAMES JOSEPH [Special Final], Rogerstown House, Lusk, Co. Dublin, Eire. J. O'H. Hughes, Vincent Kelly and Raymond McGrath.

GRAY : ALFRED JOHN (Victoria Univ., Manchester Sch. of Arch.), 38 Wordsworth Road, Reddish, Stockport, Cheshire. Prof. R. A. Cordingley, J. P. Nunn and Lieut.-Col. G. B. Howcroft.

GREEN : TREVOR CURZON (Liverpool Sch. of Arch., Univ. of Liverpool), 141 Greenway Road, Runcorn, Cheshire. Prof. L. B. Budden, B. A. Miller and D. Brooke.

HAGUE : JOHN AMOS [Special Final], 55A St. Giles Street, Northampton. W. Rosser, F. H. Allen and Keightley Cobb.

HALL : JOHN BUCHAN (Edinburgh Coll. of Art, Sch. of Arch.), Ladhope Vale, Galashiels, Selkirk. J. R. McKay, Leslie Graham-Thomson and R. Fairlie.

HENGIST : CHARLES JAMES AMBROSE [Final], "Hatchwoods," North Road, Three Bridges, Sussex. H. B. Elkington, the Hon. John Seely and Joseph Addison.

I'ANSON : TOM NORMAN [Final], "Eastleigh," East Street, Newtown, Huntingdon. F. Chippindale, W. A. Lea and T. H. Longstaff.

JANES : ERIC RALPH [Special Final], Heath End Cottage, Flackwell Heath, Bucks. R. G. Brocklehurst, Robert Atkinson and Louis de Soissons.

JOHNSON : Mrs. CONSTANCE MARY (Leeds Sch. of Arch.), 974 Scott Hall Road, Moortown, Leeds, Yorks. Applying for nomination by the Council under Bye-law 3 (*d*).

KEYES : JULIAN WALTER (The Poly., Regent Street, London, Sch. of Arch.), 22 Claremont Park, Finchley, N.3. E. C. Scherrer, Jane Drew and E. M. Fry.

KING : BASIL CLIFTON [Special Final], 8 Worcester Crescent, Mill Hill, N.W.7. O. H. Leicester, E. S. Barr and Samuel Beverley.

LARRINGTON : CLIFFORD TALBOT [Final], "Greenaway Cottage," Ashburton, Newton Abbot, S. Devon. Edwin Williams, R. Wilson and B. H. Toms.

LEWIS : (Miss) JEAN ELIZABETH JARMAN (Welsh Sch. of Arch., The Tech. Coll., Cardiff), The Willows, Lisvane Road, Llanishan, Cardiff. Sir Percy Thomas, Lewis John and T. A. Lloyd.

LOCK : WILLIAM CHARLES [Final], 82A Westmoreland Road, Bromley, Kent. N. F. Cachemaille-Day, O. Campbell Jones and C. W. Box.

LUMSDEN : JOHN LAWRIE (Edinburgh Coll. of Art, Sch. of Arch.), 77 M'Donald Road, Edinburgh, 7. T. F. Maclennan, W. I. Thomson and A. A. Foote.

MCDONALD : GEORGE GORDON [Special Final], 21 Glasgow Road, Paisley. J. S. Maitland, L. W. Hutson and Jos. Weekes.

MCLAUCHLAN : STEWART FARRINGTON (Liverpool Sch. of Arch., Univ. of Liverpool), Cadnant, Maes du Avenue, Llandudno, N. Wales. Prof. L. B. Budden, B. A. Miller and Donald Brooke.

MASSEY : LAWRENCE, Dip.Arch.Manc. (Victoria Univ., Manchester Sch. of Arch.), Pear Tree Cottage, Chester Road, Holmes Chapel, Crewe, Cheshire. Prof. R. A. Cordingley, E. S. Benson and Percy Howard.

MAW : GEOFFREY MORRISON [Final], 52 Barrowgate Road, Chiswick, W.4. L. G. Pearson, Dr. Charles Holden and Stanley Hamp.

MAXWELL : JOHN MAITLAND (Arch. Assoc., London), 12 The Mount, N.W.3. R. de W. Aldridge, H. A. Gold and R. H. Sheppard.

MOFFAT : DANIEL THOMAS (Liverpool Sch. of Arch., Univ. of Liverpool), c/o 70 Leacroft Road, Derby. P. H. Lawson, H. T. Seward and T. W. East.

NATTRASS : Mrs. MARY (Arch. Assoc., London), Springfield, 46 Hartburn Lane, Stockton-on-Tees. Hope Bagenal, R. R. Kitching and Arthur Harrison.

NEEDES : PERCIVAL JAMES [Final], 20 Oakley Avenue, Barking, Essex. J. K. Hicks, Col. A. L. Abbott and W. Beswick.

ODDIE : GUY BARRIE, B.Arch. (King's Coll., Univ. of Durham), 10 Wallace Terrace, Ryton-on-Tyne, Co. Durham. Prof. W. B. Edwards, A. C. Bunch and R. N. Mackellar.

OLIVER : DAVID WARE [Final], 7 Northumberland Buildings, Bath. G. D. G. Hake, T. W. Snailum and Hugh Bankart.

OWEN : WALTER GLYN [Final], Borough Architect's Dept., Priory Walk, Dudley, Worcs. J. R. Piggott, Clifton Edwards, and A. R. Scrivener.

PAGE : STANLEY GLASSON [Special Final], 5 Chumleigh Walk, Surbiton, Surrey. F. Sutcliffe, H. T. B. Barnard and C. V. Ponder.

PARRY : MERVYN HENRY, D.F.C., A.F.C. [Special Final], "Fifteen," Wytham Village, Oxford. A. F. B. Anderson, H. A. Welch and R. Atkinson.

PASSMORE : EDWARD [Special Final], 7 Bulstrode Street, W.1. B. L. Sutcliffe, E. R. Taylor and Sir Thomas Bennett.

PATTON : HENRY ALEXANDER (Edinburgh Coll. of Art, Sch. of Arch.), "Duniris," Downshire Road, Bangor, Co. Down. W. I. Thomson, T. R. Eagar and R. S. Wilshere.

PORTER : GRAHAME KENNETH, Dipl.Arch.(Dist.) (Welsh Sch. of Arch., The Tech. Coll., Cardiff), 44 The Parade, Cardiff. Lewis Jol n, Sir Percy Thomas and T. E. Smith.

PRATT : HAROLD JAMES CULLERNE [Final], 32 Arundel Gardens, Goodmayes, Essex. J. F. Howes, F. L. Jackman and W. J. Gomm.

PYNE : HENRY JOHN EVERETT [Special Final], 19 Palace Court Gardens, N.10. C. G. Stillman, H. W. Burchett and T. F. Hawkes.

RADFORD : HEDLEY GEORGE [Final], 18 Derwent Avenue, Allestree, Derby. E. W. Pedley, T. H. Thorpe and R. W. Cooper.

SCOTT : CHARLES FREDERICK [Final], 172 Southmead Road, Westbury-on-Trym, Bristol. J. N. Meredith, L. G. Hannaford and H. E. Matthews.

SECRETT : MICHAEL JOHN FREDERICK [Special Final], 40 The Park, Ealing, W.5. A. F. Hooper, C. W. Box and L. H. Bucknell.

SHEPHEARD : MICHAEL HENRY (Liverpool Sch. of Arch., Univ. of Liverpool), 13 South Bank, Oxton, Birkenhead. Prof. L. B. Budden, J. E. Marshall and D. L. Bridgwater.

SHIPP : GODFREY BARNES (Nottingham Sch. of Arch.), 33 Burleigh Road, West Bridgford, Nottingham. George Checkley, T. C. Howitt and P. J. Bartlett.

SMITH : JOHN [Special Final], 9 Stewart Street, Bury, Lancs. Applying for nomination by the Council under Bye-law 3 (*d*).

SQUIRES : JOHN HORACE RUSSELL (The Poly., Regent Street, London, Sch. of Arch.), 5 Earl's Court Gardens, S.W.5. E. C. Scherrer, J. K. Hicks and L. A. Chackett.

STAFFORD : ROBERT HENRY PARKER [Final], 29 Endway, Surbiton, Surrey. Frederick Barber, S. P. Anderson and J. W. Spink.

STEWART : DONALD RAE, B.A., Dip.Arch.(Cantab) [Final], 17 Avenue Road, Bishop's Stortford, Herts. J. Macgregor, Peter Bicknell and Prof. A. E. Richardson.

THOMAS : EDWARD TREVOR [Special Final], 17 Lansdowne Terrace East, Gosforth, Newcastle-on-Tyne, 3. R. G. Roberts, R. N. Mackellar and W. Tweedy.

THOMS : KENNETH OGILVIE (Edinburgh Coll. of Art, Sch. of Arch.), 14 Coates Gardens, Edinburgh. A. A. Foote, Leslie Grahame-Thomson and J. R. McKay.

THORNLEY : ROY DESMOND [Final], Great Bramington Hall, Nr. Luton, Beds. W. H. Arend, L. A. Farman and applying for nomination by the Council under Bye-law 3 (*d*).

TURNBULL : PHIPPS (Edinburgh Coll. of Art, Sch. of Arch.), 3 Lennox Street, Edinburgh, 4. R. S. Reid, A. A. Foote and F. W. Newman.

WALTERS : WILLIAM JOSEPH [Special Final], "Y Glyn," Llangunnor Road, Carmarthen. E. C. Scherrer, J. K. Hicks and L. A. Chackett.

WATERHOUSE : JACK (Liverpool Sch. of Arch., Univ. of Liverpool), "Avilion," 9 Hala Crescent, Scotforth, Lancaster. C. E. Pearson, Herbert Thearle and F. J. M. Ormrod.

WHITELEY : MISS MARGARET (Leeds Sch. of Arch.), High Gate, Hammerstones Road, Elland, Yorkshire. Applying for nomination by the Council under Bye-law 3 (*d*).

WHITTLE : JACK [Final], 34 Habgood Road, Loughton, Essex. Harold Mileson, D. W. Aldred and L. S. Stanley.

WILDGUST : ALBERT [Final], 35 Manor Road, Shaw, Lancs. L. C. Howitt, W. A. Johnson and G. N. Hill.

WILLIAMS : GILBERT BECKET ARTHUR [Final], 67 Cherry Tree Walk, West Wickham, Kent. Thos. E. Scott, Robert Lutyens and Harold Greenwood.

WILLIAMS : JOHN, Dip.Arch.(Dist.) Lvpl. (Liverpool Sch. of Arch. Univ. of Liverpool), 28 Ferguson Road, Liverpool, 11. Prof. L. B. Budden, J. E. Marshall and Herbert Thearle.

WYLER : DERRECK ROY [Final], 21 Braefield Drive, Thornliebank, Renfrewshire. Ronald Bradbury, J. A. Coia and T. J. Beveridge.

AS LICENTIATES (30)

ANDERSON : WILLIAM, Housing and Valuation Dept., L.C.C., County Hall, S.E.1 ; 5 Ranelagh Court, Glendale Avenue, Edgware, Middlesex. J. W. Hepburn, G. W. Home and W. J. Durnford.

ARMITAGE : HERBERT KELSALL (Major R.E.), 130 Haverstock Hill, Hampstead, N.W.3. Lieut.-Col. G. Val Myer, and applying for nomination by the Council under Bye-law 3 (*d*).

BANHAM : CHARLES THOMAS, Architects' Dept., L.C.C., County Hall, S.E.1. ; 28 Priory Gardens, Hanger Lane, Ealing, W.5. Hugh Braun, Edwin Williams and R. Wilson.

COLLINGS : GEORGE FREDERICK, 169 Forest Road, Coalville, Leicester. Applying for nomination by the Council under Bye-law 3 (*d*).

CORFIELD : CLAUD WILLIAM ROGER, M.A.Cantab., Strand Chambers, Falmouth ; No. 5 Wood Lane, Falmouth. A. C. Bunch, T. H. Lyon and T. S. Attlee.

CRAWLEY-CHALLENER : LEONARD, Architects' Dept., L.C.C., County Hall, S.E.1 ; 81 Fairford Gardens, Worcester Park, Surrey. J. W. Hepburn, Edwin Williams and R. Wilson.

DADLEY-MOORE : ARTHUR, 15 Adeline Place, Bedford Square, W.C.1 ; 3 Leigh Road, Leigh-on-Sea, Essex. Robert Cromie, Cecil Masey and Niel Martin-Kaye.

DUCRET : CECIL THOMAS GEORGE, Architects' Dept., Ministry of Education, Belgrave Square, S.W.1 ; "Beaulieu," The Woodlands, Chelsfield Park, Farnborough, Kent. G. M. Trench, F. G. A. Hall and C. J. Burnett.

GUNNELL : WALTER BERNARD, M.B.E. (Major), Chief Housing and Town Planning Officer, North Rhine Province, Dusseldorf, B.A.O.R. ; Fern Cottage, Chilham, Canterbury, Kent. S. Clough and applying for nomination by the Council under Bye-law 3 (*d*).

HAWES : HERBERT BADEN CHARLES (MAJOR), Architect's Office, Great Western Railway, 121 Westbourne Terrace, Paddington, W.2 ; "Swaffham," 24 Chalvey Road East, Slough, Bucks. B. B. Lewis, P. Culverhouse and W. D. Hartley.

HERBERT : LEONARD CHARLES GEORGE, c/o Town Hall, High Road, Wood Green, N.22 ; 58 Brycedale Crescent, Southgate, N.14. A. W. Hall, C. Scriven and J. E. M. Macgregor.

IND : LESLIE, Architects' Dept., L.C.C., County Hall, S.E.1 ; 83 Alma Road, Windsor, Berks. J. W. Hepburn, Edwin Williams and R. Wilson.

JAY : FREDERICK EDMUND, 17 Cornhill, Dorchester ; 38 Cleveland Avenue, Weymouth. H. E. Matthews, E. W. Lewis and E. H. Evans.

KENDALL : EDWIN PERCY, c/o War Damage Commission, Bankside House, 107-112 Leadenhall Street, E.C.3 ; 15A Princes Avenue, Gunnersbury Park, W.3. Frederick Taylor, Alfred Forrester and Philip Tilden.

KENYON : HORACE GOODALL, Stratford House, Old Station Road, Newmarket, W. Suffolk. Applying for nomination by the Council under Bye-law 3 (*d*).

LYNDE : RONALD DOBELL, c/o Messrs. Hunt, Steward & Currey, 40 Watling Street, E.C. ; 24 Malden Hill Gardens, New Malden, Surrey. H. W. Currey, E. M. Joseph, H. S. Davis.

MARSH : WALTER, C.R.E. County Club, Carmarthen ; The Hall, Windsor Road, Abergavenny, Mon. J. H. Walters and applying for nomination by the Council under Bye-law 3 (*d*).

OGDEN : LIONEL GEORGE DOUGLAS, Lutterworth Road, Ullesthorpe, nr. Rugby. E. J. Williams and the President and Hon. Sec. of the Leicester and Leicestershire Soc. of Arch. under Bye-law 3 (*a*).

PARRY : ELWYN, County Architect and Surveyor's Dept., County Buildings, Mold, Flintshire ; Fairmeadow, Hendy Road, Mold. F. A. Roberts and applying for nomination by the Council under Bye-law 3 (*d*).

PIGGINS : WILFRID CHARLES, Ministry of Works, Abell House, S.W.1 ; 13 Chalkpit Lane, Dorking, Surrey. Z. Sirotkin, A. G. Alexander, C. G. Mant.

ROBINSON : WILLIAM EDWARD, Friary, Holroyd & Healy's Breweries, Guildford, Surrey ; 1 Ellis Avenue, Onslow Village, Guildford. J. K. Hicks and the President and Hon. Sec. of the S.E.S.A. under Bye-law 3 (*a*).

RUSHTON : NORMAN JAMES, 21 Markham Street, S.W.3. H. W. Binns, A. R. F. Anderson, J. F. Smith.

SCHREINER : JOHANNES, 21c Dalcham Gardens, N.W.3. G. G. Wornum, Prof. Sir Charles Reilly, E. M. Fry.

SMITH : DENIS, Borough Surveyor and Architect's Dept., Town Hall, Rochdale ; 24 Kings Road, Rochdale. S. G. Eldred and applying for nomination by the Council under Bye-law 3 (*d*).

SMITH : HARRY, 231 The Vale, Acton, W.3 ; 13 Hogarth Road, Hove, 3, Sussex. S. C. Garrett, S. H. Tiltman, E. A. Verger.

STEWART : GEORGE SMITH, Borough Surveyor's Office, Fraserburgh, Aberdeenshire ; Clinton House, King Edward Street, Fraserburgh. Applying for nomination by the Council under Bye-law 3 (*d*).

STURTON : WALTER LAURENCE, c/o Messrs. Hood & Huggins, F./F.S.I., 34 Watford Road, Northwood, Middlesex ; 14 Birch Grove, W.3. L. H. Bucknell, R. E. Enthoven, John Grey.

WILLIAMS : JOHN LESLIE MAXWELL, c/o Messrs. H. S. Fairhurst & Son, 55 Brown Street, Manchester ; 21 Roselands Road, Homeland Road, Sale, Manchester. P. G. Fairhurst, J. W. Wilson, S. E. Castle.

WILLIS : ARTHUR WILLIAM (MAJOR), Messrs. Val Myer, Hart & Willis, 22 Grosvenor Crescent Mews, Hyde Park Corner, S.W.1 ; Knights Cottage, Castle Hill Avenue, Berkhamsted, Herts. Lieut.-Col. G. Val Myer, F. J. Watson-Hart and H. A. Welch.

WRIGHT : PHILIP RALPH, 13 Crawford Street, W.1 ; 1 Albert Road, South Norwood, S.E.25. H. S. Goodhart-Rendel, H. L. Curtis and C. J. Epril.

ELECTION : 11 MARCH, 1947

An election of candidates for membership will take place on 11 March 1947. The names and addresses of the overseas candidates, with the names of their proposers, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Saturday, 1 March 1947.

The names following the applicant's address are those of his proposers :—

AS FELLOWS (3)

BASTO : ANTONIO HERMENEGILDO [*A.* 1922], Princes Building (3rd floor), Hong Kong ; Gloucester Hotel (Room 702), Hong Kong. G. L. Wilson, G. W. Grey and H. J. Tebbutt.

DEOLALIKER : GANESH BHIKAJI [*A.* 1929], 4 Mahadeo Road, New Delhi. L. M. Chitale, P. L. Sharma and C. M. Master.

MITCHELL : CYRIL HAWTHORN [*A.* 1915], National Bank Chambers, Wellington, New Zealand ; 10 Maida Vale Road, Wellington, E.1. W. G. Young, W. H. Gummer and C. R. Ford.

AS ASSOCIATES (6)

FLEMING : DOUGLAS FORSTER [Passed a qualifying Exam. approved by the R.A.I.], 4 Neridah Street, Chatswood, New South Wales, Australia. B. J. Waterhouse, Samuel Lipson and J. C. Fowell.

GRAY : LACHLAN JAMES (Univ. of Auckland Sch. of Arch.), 106 Dee Street, Invercargill, New Zealand. Applying for nomination by the Council under Bye-law 3 (*d*).

HALL : FRANCIS RICHARD [Passed a qualifying Exam. approved by the R.A.I.A.], Dewar Terrace, Corinda, Brisbane, Queensland, Australia. J. F. Hennessy, J. C. Fowell and J. L. S. Mansfield.

HOWIE : WILLIAM DUNCAN, B.Arch. (Rand) [Passed a qualifying Exam. approved by the I.S.A.A.], Faculty of Architecture, University of the Witwatersrand, Milner Park, Johannesburg, South Africa. Applying for nomination by the Council under Bye-law 3 (*d*).

MALONEY : THOMAS MEYERS [Passed a qualifying Exam. approved by the R.A.I.A.], "Kelvin," 22 Harbourne Road, Kingsford, Sydney, New South Wales, Australia. H. G. Turner, J. F. Hennessy and J. C. Fowell.

TOYKANDER : BENGT. [Passed a qualifying Exam. approved by the R.A.I.A.], 9-11 Castlereagh Street, Sydney, New South Wales, Australia. C. C. Ruwald, W. R. Richardson and G. S. Keesing.

AS LICENTIATE (1)

OGILVIE : GORDON CECIL WENTWORTH, Assistant Municipal Engineer, P.O. Box 651, Nairobi, Kenya Colony ; Karen, Nairobi. S. L. Blackburne and the President and Hon. Sec. of the East Africa Inst. of Arch. under Bye-law 3 (*a*).

OBITUARIES

Percy John Black [*L.*]

Mr. Percy John Black [*L.*] died on 15 July 1946 after a short illness. Mr. Baxter Greig [*F.*] has sent us the following appreciation :—

"I first met Percy John Black in 1907 when he was assistant to the late S. Flint Clarkson, then District Surveyor for Kensington. Black had his first appointment as District Surveyor for Battersea Central on 1 January 1911, later going to Lambeth North and finally to Kensington South. He formed an early association with Grafton Square Church at Clapham and his active interest was maintained over a period of more than half a century.

"A physical disability made him unfit for active service in the 1914-18 war and his war-time work then included the Secretaryship of the Road Stone Control Board. His flair for secretarial work was recognised by his colleagues of the District Surveyors' Association and he established a record by being Honorary Secretary for ten years. He made another record by filling the Presidential Chair for two periods, 1931-33 and 1937-41. He was also President of the Institution of Structural Engineers for the Session 1939-40.

"In his work it was always his desire to give service ; his attention to detail and quiet perseverance in securing the proper execution of all works under his supervision were well known among those who habitually came in contact with him.

"During the closing months of 1939 he organised the Rescue Service in Kensington and later was engaged in a general advisory capacity at County Hall and at Regional Headquarters on the War Debris Survey. Since 1940 he also worked on a committee dealing with the proposed revision of the bye-laws under the London Building Acts (Amendment) Act, 1939. He was due to retire from his District appointment in February 1944, but he remained in part-time attendance and was also engaged in part-time work for the Home Office in connection with War Damage. It was during one of his journeys that he suffered a stroke and was taken to University College Hospital, where he lay for a fortnight. He died on 15 July 1946.

"Black will best be remembered among his contemporaries for his firm adherence to the principle of *suaviter in modo*. He was highly esteemed by all his colleagues, and his passing leaves a sense of personal loss to many of us."

William Court Johnston, M.C. [*L.*]

The death of Mr. William Court Johnston, M.C. [*L.*] has occurred at the age of fifty-one. He was trained in the office of A. W. Johnston, Carlisle, and practised in Carlisle from 1922 to the date of his death. He held the appointment of Panel Architect in the service of the Commissioner of Inland Revenue and was at the time of his death a member of the Committee of the Cumberland Branch of the Northern Architectural Association.

He executed extensive work for industrial and agricultural firms and companies in the North of England as well as private domestic work throughout Cumberland. Many garages and transport stations in the county of Cumberland owe their being to Mr. Johnston's design.

The partnership existing between Mr. Johnston and Mr. Ralph Wright [*L.*] will be succeeded to by Mr. Wright, who will continue under the style of Johnston & Wright at 13 Castle Street, Carlisle.

Charles Melville Seth-Ward [*F.*]

It is with regret that we record the death of Mr. Charles Melville Seth-Ward [*F.*] at the age of seventy-eight. He was trained in the office of Sir Ernest Newton, R.A., in London, and commenced private practice in 1894.

His principal architectural works were Rushbrooke Hall, Suffolk ; Cadbury Court, Somerset ; Spring Hill, Worcestershire ; Wilton Place, Beaconsfield ; Heatherden Hall, Bucks. ; cinema houses in the West End of London ; licensed premises in the Home Counties ; Wellington Court, St. John's Wood ; and the Grayshott Convalescent Home.

Mr. Seth-Ward served on the staff of the R.F.C. in the 1914-18 war and was a Liveryman of the Guild of Glaziers and Painters on Glass, a Freeman of the City of London, and a member of the Institute of Mechanical Engineers.

Messrs. C. W. Eastick [*L.*] and J. W. Drake [*L.*] will carry on Mr. Melville Seth-Ward's practice at their temporary address, Sutmer Court, Chalfont St. Giles, Bucks.

Major George Thomas Caryer [*F.*]

We regret to record the death of George Thomas Caryer [*F.*] at the age of sixty-six.

He was trained in the offices of Messrs. Robb & Grierson in London from 1896-1899 and upon completion of his articles he joined the office of Mr. A. Dixon, subsequently becoming Mr. Dixon's chief assistant. From 1915 to 1921 he was in His Majesty's Forces and saw much war service, attaining the rank of Major, Royal Engineers. From 1921 to 1923 he worked in Iraq for the War Office and the Royal Air Force as Deputy Director of Works and in the Works and Buildings Department respectively until his appointment in November 1923 to the Iraq Government as Public Works Department Executive Engineer.

From 1926 to 1945 Major Caryer held senior grade appointments in various branches of the Government of Palestine, carrying out a number of architectural designs and schemes, and in April 1942, while serving as Senior Executive Engineer, Jerusalem District, he was seconded to the Palestine Government's Department of Controller of Heavy Industries, being appointed Assistant Controller.

In 1937 Major Caryer was awarded the Coronation Medal and in 1942 the General Service Medal with clasp "Palestine."

Thomas Inglis Goldie [*A.*]

The death on 10 June 1946 occurred at Wells, Norfolk, of Mr. Thomas Inglis Goldie [*A.*] at the age of 76. He practised in Norwich for some years and in Wells, Norfolk, for twenty years. He was responsible for much domestic architecture and drainage schemes in and around Walsingham and Melton Constable, as well as for town planning schemes in the Urban Council of Wells-next-Sea. He was the author of two literary works, "The Heart of a Caprice" and "Dr. Quantrill's Experiment."

Geoffrey George Phillips [*F.*]

Mr. Geoffrey George Phillips [*F.*] died on 8 August 1946 at Bridgnorth, Shropshire, at the age of 39.

He was trained in Bridgnorth, commenced private practice in 1930, and was responsible for numerous housing schemes for the Shifnal Rural District Council and also the Tasley Estate Development, Bridgnorth.

Henry Pynor [*A.*]

The death is recorded in Sydney, N.S.W., of Mr. Henry Pynor [*A.*] at the age of 45 years on 18 June 1946.

Mr. Pynor held the Diploma in Architecture of Melbourne University and was a Fellow of the Royal Australian Institute of Architects, being Vice-President of the New South Wales Chapter of that body. He had considerable overseas experience, including a responsible position with Messrs. Burnett, Tait & Lorne and a senior designing position as a foreign specialist in Russia during the development of the first five-year plan.

Mr. Pynor had been in practice in Sydney as a partner in the firm of Herbert, Wilson & Pynor and at the time of his death was Lecturer in Charge of the Department of Architecture of the Sydney Technical College.

John Harold Gask [*A.*]

Mr. John Harold Gask [*A.*] has died at the age of 66. He was trained from 1897 to 1902 in the offices of Messrs. Barker & Ellis, of Manchester, and studied quantity surveying with Messrs. Radcliffe & Chadwick, of that city. He was in private practice in Bolton until 1911, after which he held a series of public appointments, the highest being that of Surveyor of Works in the War Department, which he took up in 1924 and held until 1942.

From 1942 to September 1945 Mr. Gash was an assessor with the War Damage Commission in London. He was a Fellow of the Royal Institution of Chartered Surveyors.

W. T. Creswell, K.C. [*Hon. A.*]

The death has been announced of Mr. William Thomas Creswell, K.C. [*Hon. A.*], on 10 October, at Epsom, at the age of 73. He was an authority on building law.

Born in 1872, Mr. Creswell spent some years in the office of A. R. Barker, surveyor to Winchester diocese. He subsequently worked for the War Office as Temporary Surveyor at Aldershot, Colchester and in Hong Kong respectively, and pursued legal and commercial studies at King's College, London. After service in the South African War as an Acting Divisional Officer, R.E., he practised privately in London as an architect. On the outbreak of the 1914-18 war he volunteered and was appointed Divisional Officer R.E., Salisbury Plain. After 1918 he obtained a commission in the Army Education Corps, with which he served in England and in Egypt, retiring from the Corps in 1922. By this time he had been called to the Bar and in 1922 he joined the South-Eastern Circuit where his knowledge of the building trade won him a large practice. He took silk in 1933.

Mr. Creswell wrote a number of standard works on building law including "The Law Relating to Building and Engineering Contracts" (published 1924), "Procedure and Evidence in Arbitration" (published 1930, 2nd edition 1946), "The Law of Fixtures," "The Power of the Architect," "Law Relating to Dilapidations and Waste" and "Extras." As well as being an honorary Associate, he was an Associate of the Royal Institution of Chartered Surveyors, a fellow of the Royal Sanitary Institute, and an Hon. Member, Institute of Arbitrators.

He married Mary Isabel Carr in 1896 and celebrated his golden wedding anniversary on 4 April this year. To his widow his many friends in the Institute will extend their sympathy.

CORRESPONDENCE

The Daylighting of Classrooms under the New Regulations.

To the Editor, JOURNAL R.I.B.A.

SIR,—The article by Messrs. Allen and Bickerdike, of the B.R.S., in the September JOURNAL corroborates the proof given in an article in your issue of May last of a point of no small public importance which had been elicited in the discussion of Mr. Stillman's paper on the design of schools. It is that, under the 1945 Regulation of the Ministry of Education as to the natural lighting of school classrooms, multi-storey schools are impracticable or impossible, especially in towns where the acquisition of school sites sufficiently spacious to accommodate single storey buildings would, even if it were possible, add several millions to the cost of the many new schools demanded by the raising of the school-leaving age.

This is in spite of the fact that the regulation reduces by no less than 60 per cent. the specific recommendation for the natural lighting of school classrooms made in 1944 in the Report on the Lighting of Buildings of the Building Research Board of the D.S.I.R. published by H.M.S.O. as No. 12 in the series of Post-War Building Studies issued by the Ministry of Works.

The published list of members of the two Committees responsible for that Report mentions no ophthalmic or medical qualifications. The reduction by the Ministry of Education is, of course, more or less fatal to the reputation of the Report as final authority. Taken in conjunction with the lack of medical qualifications of the Committees, it is in fact sufficient to reduce the findings with regard to the functional requirements of different classes of interiors (essentially, if not exclusively, dependent upon medical evidence) to the level of well-meaning amateur guesswork. Large as the Ministerial reduction is, however, it has obviously proved to be insufficient to achieve its main object, which according to the authors of the article, is to render the Regulation applicable to buildings old and new.

The question as to whether there is any need to tamper at all with the long established pre-war standard for school classrooms of a minimum of 0.5 per cent. daylight factor on the worst lit desk has never been answered satisfactorily. That standard was first deduced in this country some 25 years ago by a committee of doctors and physicists by the simple process of measuring the daylight factor values to be found in new classrooms, lit, not only sufficiently but amply, by large high windows on the left-hand side facing open playgrounds. As soon as it was published it proved to be precisely identical with official regulations for Government schools on the Continent and remained unquestioned for some years. Later it was criticised as being theoretically inconsistent with a standard which had been suggested for artificial lighting. It was therefore revised by a Joint Committee convened by the Illuminating Engineering Society upon which the then Board of Education, the D.S.I.R. and the R.I.B.A. were represented. No medical or other evidence proved to be forthcoming that the eyesight of a single child had ever suffered from the 0.5 per cent. standard and the joint Committee contented itself with the obvious suggestion in its report that, where circumstances permitted (as they do in single-storey schools), a somewhat higher minimum should be obtainable.

The only body competent to decide to-day whether ophthalmic or medical evidence exists to justify any raising of the pre-war standard would be a committee of ophthalmic and physiological experts convened by the British Medical Council.

If the minimum of 5 per cent. daylight factor recommended in the B.R.S. Report is really necessary or desirable on proven medical grounds, then it should be adopted fearlessly, whatever the consequences; for the eyesight of young children is very precious. No additional expense would be incurred thereby, because once multi-storey buildings are barred, it is as easy to design for the 5 per cent. minimum of the Report as for the 2 per cent. minimum of the Regulation by means of bi-lateral and/or top lighting.

If, on the other hand, the 2 per cent. minimum is unnecessarily high, then every penny of public money wasted pending revision of the Regulation is reprehensible.

Yours faithfully, PERCY J. WALDRAM.

Editor's Note. Mr. Waldram's letter was sent to Messrs. Allen and Bickerdike. They replied as follows :

To the Editor, JOURNAL R.I.B.A.

As well as a number of questions of personal opinion, Mr. Waldram's letter contains a statement inviting a reply.

He suggests we have shown that under the new Regulations multi-storey schools are "impracticable or impossible, especially in towns . . ." etc. He does not say what impels him to this conclusion and one cannot reply explicitly therefore; but the point would be important if it were correct and we feel we should recall briefly the facts as we recorded them.

In a classroom 11 ft. high lighted from one side only it is not possible to reach the required daylight factor of 2 per cent. over the whole area, even if the window is unobstructed. Borrowed light from the corridor can be used, however, and it was shown that when this is employed the required standard can be reached with a margin sufficient to allow a moderate degree of obstruction—say up to about 20%. This is sufficient for most districts, but it should be further recalled that one can reasonably resort to higher ceilings, up to 14 or 15 ft., on the ground floor if the building is in a congested area. It seems evident therefore that the new standard should not operate unduly onerously nor produce the results which Mr. Waldram suggests.

Yours faithfully,
WILLIAM ALLEN. J. B. BICKERDIKE.
Building Research Station (Department of Scientific and Industrial Research).

Planning in the Third Dimension

To the Editor, JOURNAL R.I.B.A.

SIR,—I read with much interest the letter in the October number of the JOURNAL from Mr. Gibson with reference to the Town and Country Planning Summer School, and I should like to add my word of support for his very excellent suggestions with regard to three dimensional planning.

The problem facing Mr. Gibson in Coventry is shared by cities not only in England but all over the world; even those which have escaped damage through civil or foreign war have problems of obsolescence and blight for which rebuilding is the only cure.

In dealing with large-scale civic reconstruction the parts to be played by public and by private enterprise, and the methods of control so that a number of architects working for a number of developers may still achieve a coherent result, are among the most pressing problems of our time, upon which, incidentally, the many admirable planning reports have so far thrown little light.

As these problems are of immediate concern to the whole architectural profession—whether engaged in official or private practice—it may be thought that the R.I.B.A. should give them special consideration. If an authoritative committee convened for the purpose by the Royal Institute were to publish recommendations regarding the organisation and procedure necessary to carry out schemes of major rebuilding in an architecturally satisfactory manner, such a report would, I feel sure, be of great assistance to all those now concerned in this work and, coming at this time, might have important results for the future of architecture and architects.

Yours faithfully,

DENIS WINSTON [*A.*]

NOTES AND NOTICES

NOTICES

The Second General Meeting

TUESDAY, 26 NOVEMBER 1946, AT 6 P.M.

The second general meeting of the session 1946-47 will be held at 6 p.m. on Tuesday, 26 November 1946, for the following purposes:—

To read the minutes of the inaugural general meeting held on 12 November 1946; formally to admit members attending for the first time since their election.

Mr. Richard Sheppard [*F.*] to read a paper on "Aspects of Post-war Building Technique."

Light refreshments will be provided before the meeting.

The Third General Meeting

TUESDAY, 10 DECEMBER 1946, AT 6 P.M.

The third general meeting of the session 1946-47 will be held at 6 p.m. on Tuesday, 10 December 1946, for the following purposes:—

To read the minutes of the second general meeting held on 26 November 1946; formally to admit members attending for the first time since their election.

Mr. John Summerson, F.S.A. [*A.*], Curator, Sir John Soane's Museum, to read a paper on "Heavenly Mansions. An Interpretation of Gothic."

Light refreshments will be provided before the meeting.

REVISION OF CLAUSE (E) OF THE REGULATIONS GOVERNING THE PROMOTION AND CONDUCT OF ARCHITECTURAL COMPETITIONS

Clause (E) of the Regulations governing the Promotion and Conduct of Architectural Competitions at present reads as follows:—

"If no instructions are given to the author of the design selected by the Assessor to proceed within twelve months from the date of the award, then he shall receive payment for his services in connection with the preparation of the Competition drawings of a sum equal to 1½ per cent. on the amount of the estimated cost stated in the conditions up to £50,000, but if the estimated cost of the work exceeds £50,000 he shall be paid a sum equal to 1½ per cent. upon the first £50,000 plus ½ per cent. upon any sum in excess of that amount. The first premium shall be deducted from the sum so paid. If the work is subsequently proceeded with, this sum shall form part of his ultimate commission.

"If within twelve months of the award, the Promoters shall decide to proceed with part of the work only, the author of the selected design shall be paid, including the premium and in addition to the scale fees on the work which is being carried out, a sum equal to 1½ per cent. on the difference between the cost of the work carried out and his estimate of cost up to £50,000, and if the total estimate exceeds £50,000, then a further ½ per cent. on any sum in excess of this amount, which sum shall also merge into the commission when the remainder of the work is subsequently executed."

In view of the increased cost of building, the Council, on the recommendation of the Competitions Committee, have amended this Clause by substituting the figure "£100,000" for "£50,000."

Cessation of Membership

Under the provisions of Bye-law 21 the following have ceased to be members of the Royal Institute:

As Fellows

John Percival Bishop, Charles William Bowles, Henry Anthony Mealand, Henry Thomas Wright.

As Associates

Maxwell Fordyce Christie, George Joseph Watson Haswell, Francis Anthony Johnson, Lionel Edgar Alfred Sargant, Geoffory Somerton, Arthur Zimmerman Stewart, Jack Scott Thompson.

Composition of Subscriptions for Life Membership

Fellows, Associates and Licentiates of the Royal Institute may become Life Members by compounding their respective annual subscriptions on the following basis:—

For a Fellow by a payment of £102 18s. (98 guineas).

For an Associate or Licentiate by a payment of £58 16s. (56 guineas), with a further payment of £44 2s. (42 guineas) on being admitted as a Fellow.

In the case of members in the Dominions overseas who are members of Allied Societies in those Dominions, the following basis will operate:—

For a Fellow by a payment of £70.

For an Associate or Licentiate by a payment of £47 5s. (45 guineas), with a further payment of £22 15s. on being admitted as a Fellow.

Provided always that in the case of a Fellow or Associate the above compositions are to be reduced by £1 11s. 6d. per annum for every completed year of membership of the Royal Institute after the first five years, and in the case of a Licentiate by £1 11s. 6d. per annum for every completed year of membership of the Royal Institute, with a minimum composition of £9 9s. in the case of Fellows and £6 6s. in the case of Associates and Licentiates.

Annual Subscriptions and Contributions

Members and students are reminded of the increased subscription and contribution rates which will come into effect on 1 January 1947. A copy of the statement which was published in the June 1946 JOURNAL is being sent to every member and student, together with an amendment Banker's Order for the use of members who pay their subscriptions by this method.

The Use of Titles by Members of the Royal Institute

In view of the passing of the Architects Registration Act 1938, members whose names are on the Statutory Register are advised to make use simply of the title "Chartered Architect" after the R.I.B.A. affix. The description "Registered Architect" is no longer necessary.

R.I.B.A. Distinction in Town Planning

The R.I.B.A. Distinction in Town Planning is obtainable by Fellows, Associates (who are not less than 26 years of age) and Licentiates. The test by means of which this Distinction is awarded is conducted by special Examiners appointed by the Council of the R.I.B.A.

This award does not take the place of the R.I.B.A. Diploma in Town Planning, which is obtainable by Fellows, Associates and Licentiates of the R.I.B.A. without any minimum age limit.

The primary purpose of the Distinction is to satisfy a demand from senior architects to take a qualifying test in town planning suited to their age and existing attainments.

The Examiners will meet three times a year—in February, May and October. Applications should be submitted to the Secretary of the R.I.B.A. by 1 January, 1 April and 1 September annually.

Copies of the form of application containing the procedure, regulations, general scope of study and bibliography may be obtained free on application to the Secretary, R.I.B.A.

BOARD OF ARCHITECTURAL EDUCATION

R.I.B.A. Examination for the Office of Building Surveyor under Local Authorities

At the Examination held 9-11 October, 1946, the following were successful:

Mr. Clifford Harnott, Mr. Roland H. Thompson, Mr. Norman Willis.

R.I.B.A. Special Final Examination, Salisbury, Southern Rhodesia, July 1946

Mr. Richard P. Thomas has passed the R.I.B.A. Special Final Examination held at Salisbury, Southern Rhodesia, in July 1946.

ALLIED SOCIETIES

Hampshire and Isle of Wight Architectural Association Scholarship

The Hampshire and Isle of Wight Association has instituted an annual scholarship of £40, tenable at the School of Architecture, Southern College of Art, Portsmouth, to be awarded for merit, on the results of the first year's examination to a student member of the Association or a student attending one of the recognised art schools in the County. Subject to satisfactory progress the scholarship may be continued for the following two years to the same student. To qualify for award, candidates must also hold a recognised School Leaving Certificate, or its equivalent or be R.I.B.A. Probationers.

The first award since its inauguration was made in September to Mr. L. G. Gwilt of Boscombe, Bournemouth, a student of the Portsmouth School. There were five competitors, all from the same school, and all passed the examination at the end of their first year of study.

Nottingham, Derby and Lincoln Architectural Society

The President and Secretary R.I.B.A. attended the first post-war annual dinner of the Nottingham, Derby and Lincoln Architectural Society on 25 October at Nottingham. Mr. F. A. Broadhead [*F.*], President of the Society, was in the chair, the guests including the Lord Mayor of Nottingham, the Mayors of Derby and Lincoln, the Bishop of Southwell and the Town Clerk of Nottingham.

Mr. Broadhead, proposing the joint toast of "The Cities of Nottingham, Derby and Lincoln," said that the three cities had been extremely fortunate in escaping serious war damage. Referring to post-war plans, he said that Nottingham had planned a reconstruction scheme to extend over 50 years which, when completed, would give the city one of the finest civic centres in the country. Both Derby and Lincoln were also pressing on with plans. All three cities were tackling the problem of inadequate housing which was a shadow overhanging all plans. In reply, the Lord Mayor of Nottingham said that the layout of the city was going to be a great thing and that they wanted the best brains among architects whose advice and help would be welcome. The Mayor of Lincoln thanked the R.I.B.A. for their help in preventing the erection of an unsightly cooling tower that would have interfered with the view of Lincoln Minster.

The President, replying to the toast of "The R.I.B.A. and its Allied Societies," proposed by Mr. W. A. Sime, paid a tribute to the architect of Nottingham's Council House and of the city's first housing scheme, Mr. T. Cecil Howitt [*F.*]. He was glad that the city was following up the lead in housing given by Mr. Howitt. There was a danger that the individuality of architects might become suppressed. "It will be a sorry day for this country when the architect cannot build what he wants to build and we are told exactly what to do by a blue-print that comes down from higher spheres." He was glad to see that there was co-operation in Nottingham between the officials and architects of the city. He went on to refer to the need for cultivating public opinion on architectural and planning matters. He said: "Do your utmost to bring architecture before the people of this country. I am sure that the apathy of the British public to the beautiful things of life is caused by the fact that we who possess the ability to know what is beautiful do not transfer that knowledge in some way to them."

MEMBERS SERVING WITH THE FORCES

Decorations and Distinction

BAKER: L. F. [*A.*], Major, R.E. Again mentioned in Despatches.
BEE: P. RAYMOND [*A.*], Capt., R.E. Mentioned in Despatches.
BEGBEY: D. C. [*S.*], Capt., R.E. Mentioned in Despatches.
BEST: NORMAN [*A.*], Major, R.E. Mentioned in Despatches.
BURNETT: A. H. [*S.*], Capt., R.E. Mentioned in Despatches.
CARNEY: J. E. [*A.*], Capt., R.E. Mentioned in Despatches.
LLOYD: W. A. S., M.B.E. [*F.*], Col., R.E. Mentioned in Despatches.
LOCK: S. C. [*A.*], Major, R.E. Mentioned in Despatches.
PINION: J. T. [*S.*], Major, R.E. Mentioned in Despatches.
RIX: NORMAN [*S.*], F/Lt., R.A.F. Awarded the D.F.C.
SAUNDERS: K. H. [*A.*], Major, R.E. Mentioned in Despatches.
WEST: F. G. [*A.*], Major, R.E. Mentioned in Despatches.
WIDDAKER: T. J. [*A.*], Capt., R.E. Mentioned in Despatches.
WILKINS: L. T. [*A.*], Capt., R.E. Mentioned in Despatches.

COMPETITIONS

Shelter Competition

The London Passenger Transport Board invites architects to submit in competition designs for a bus-passenger shelter to replace the present utility war-time model.

Assessors: Prof. W. G. Holford, M.T.P.I. [*A.*], Mr. F. R. S. Yorke [*F.*], Mr. Thomas Bilbow [*F.*].

Premiums: £300; £100.

Last day for submitting designs: 8 January 1947.

Conditions may be obtained on application to the Chief Public Relations and Publicity Officer, London Transport, 55 Broadway, London, S.W.1. Envelopes should be marked "Shelter Competition."

Competition for the Extension of the Fife County Council Buildings

The County Council of Fife invite architects of British Nationality resident in Scotland to submit designs for alterations and extensions of County Buildings, Cupar, Fife.

Assessor: Mr. A. G. R. Mackenzie [*F.*].

Premiums: £500, £300 and £200.

Last day for submitting designs: 31 March 1947.

Conditions may be obtained on application to J. M. Mitchell, Esq., County Clerk, County Buildings, Cupar, Fife.

Deposit, one guinea.

Colombo Cathedral Competition

The Colombo New Cathedral Committee, in association with the Standing Committee of the Diocesan Council of the Church of Ceylon, invites architects who are qualified members of the Royal Institute of British Architects or allied bodies to submit in competition designs for the proposed Cathedral of The Holy Cross, together with Bishop's House, Divinity School, Diocesan Hall and Offices, in Colombo, on a site adjoining Buller's Road in that city. The competition is being organised by the Royal Society of Arts, London, on behalf of the Colombo New Cathedral Committee.

Assessor: Sir Giles Gilbert Scott, O.M., R.A. [*F.*].

Premiums: £500; £200; and £100.

Last day for submitting designs: 31 December 1946.

Conditions of the competition may be obtained on application to The Secretary, The Royal Society of Arts, 6 John Adam Street Adelphi, London, W.C.2. Deposit £1.

COMPETITION RESULT

Housing, Nether Liberton, Edinburgh

1. Mr. D. Stratton Davis [*A.*].
2. Mr. J. N. Pollock [*A.*] and Mr. J. Ferguson. Messrs. J. D. Cairns [*F.*] and J. F. Ford [*L.*].

GENERAL NOTES

Ordnance Survey Sheets

An appeal to members was made during the war for Ordnance Survey sheets, scale 1:2500 and 6 in. to the mile, in order that a collection might be formed in the Library. The response was good, but not large. It is hoped to make this section comprehensive as a reference set together with duplicate copies for issue on loan. Members who have further sheets lying idle from past jobs, which they would be prepared to make available to the Institute, are asked to write to the Librarian.

Hospitality to Foreign Architects

Architects prepared to give hospitality to foreign architects visiting this country are asked to write to the Secretary of the R.I.B.A. Foreign Relations Committee mentioning any preference with regard to nationality. Foreign travel for architects both to and from this country is often hampered by cost and the difficulty of finding accommodation. It is hoped that any members able to help will respond to this appeal.

Hungarian Appeal for British Architectural Literature

The Secretary of the Foreign Relations Committee of the R.I.B.A. has received an appeal from Hungary for any British architectural books and journals dealing with modern developments in English architecture and would be pleased to receive at the R.I.B.A. Library any contributions of this nature, particularly recent architectural or building journals which might otherwise be thrown away.

Journal Subscription

In future the charge for the JOURNAL to subscribers will be 2s. 6d. per issue, annual subscription £2; for Probationers and members of Allied Societies who are not members of the R.I.B.A. the annual subscription will be £1 5s.

School of Planning and Research for Regional Development

The third of the Three Months' Completion Courses in Town and Country Planning ended on 30 September. The following candidates passed the course successfully and are accordingly exempt from the final examination of the Town Planning Institute. Distinctions were obtained by :—E. W. Beaumont [*A.*], Lancaster ; S. H. A. Rollison, P.A.S.I., Tonbridge ; H. S. Howgrave-Graham [*A.*], Sussex. Other successful candidates in order of passing were :—B. Buck [*A.*], Winchester ; E. W. N. Mallows [*A.*], South Africa ; R. F. King, P.A.S.I. London ; G. T. Goalen [*A.*], London ; R. Carton Tickell, Dip.Arch. (Liverpl.), Cheshire ; B. Buchbinder, Dip.Arch. (Prague), Czechoslovakia ; J. G. Hird [*A.*], Glasgow ; P. L. Joseph [*A.*], Birmingham ; B. C. Maynard [*A.*], London ; W. Fairbank, Lancashire ; R. J. Morling, A.I.L.A., Morden ; H. J. C. Pratt [*A.*], Essex ; F. A. G. White, P.A.S.I., London ; R. A. C. Macfarlane [*A.*], Wrexham ; D. Boyd [*A.*], London ; R. L. Thorpe [*A.*], New Zealand ; B. A. Le Mare [*A.*], London ; G. A. Atkinson [*A.*], Hull ; H. Jackson [*A.*], Cambridge ; C. H. Every [*A.*], London ; L. B. Reed, Chichester.

Commonwealth Fund Fellowships

The Commonwealth Fund of New York, founded in 1918 and supported by endowment from the late Mrs. Stephen V. Harkness and the late Mr. Edward S. Harkness, has established for British subjects a number of Fellowships tenable in the United States.

The Fellowships, which are available for architects, are confined to University graduates, but a graduate who is taking a course at a School of Architecture which is not a University School would be eligible to apply for a Fellowship. Candidates must be over twenty-three and must not have attained the age of thirty-five on 1 September of the year of award. There is no fixed stipend, but the emolument attaching to each Fellowship, which is estimated at a minimum of approximately $3,500 per year, is calculated to cover the full expenses of residence, study and travel in the United States during the year.

Copies of the memorandum in connection with the above may be obtained free on application to the Secretary to the Committee of Award, Commonwealth Fund Fellowships, 35 Portman Square, London, W.1.

MEMBERS' COLUMN

This column is reserved for notices of changes of address, partnership and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than for posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

MR. J. BLACKBURN [*A.*] has been appointed Burgh Architect, Royal Borough of Inverness, and will be pleased to receive trade catalogues, etc.

MR. C. M. BOND [*A.*] (late Capt. R.E.), on release from the Forces, has been appointed a Regional Architect at the Ministry of Health (London Region). His private address is 3 The Grove, Bexleyheath, Kent.

MR. C. BROWN [*A.*], formerly Architect and Planning Officer to the Rural District Council of Kingsbridge (Devon), has been appointed Borough Engineer, Surveyor and Architect to the Congleton Corporation, and his address is The Borough Surveyor's Office, Congleton, Cheshire.

MR. H. ANTHONY CLARK [*L.*] has been appointed Chief Housing Architect to the Borough of Wrexham, and will be pleased to receive trade catalogues, etc., at 1 Grosvenor Road, Wrexham.

MR. R. D. CRUICKSHANK [*L.*], formerly in the City Architect's Department, Aberdeen, has been appointed Borough Architect, Peterhead, and will be pleased to receive trade catalogues, etc., at Municipal Chambers, Peterhead.

MR. ROBERT H. MATTHEW [*A.*] has resigned from the position of Chief Architect to the Department of Health for Scotland, and has been appointed Architect to the London County Council. His address is : The County Hall, London, S.E.1.

MR. ERIC THOMPSON [*A.*] has relinquished his post as Senior Assistant Architect in the County Architect's Department, Hampshire County Council upon his appointment as Branch Architect (Education) in the Borough Architect's Office, County Borough of Southampton.

MR. MICHAEL E. THORNELY [*A.*] has been appointed Staff Architect to Imperial Chemical Industries, Ltd., and will be pleased to receive trade catalogues, etc., at Wilton Works, Wilton Castle, Box 54, Middlesbrough.

MR. P. EDWARDS WALKER [*A.*] has been appointed Architect to the Urban District Council of Pontypool and will be pleased to receive trade catalogues, etc., at Market Buildings, Pontypool.

PRACTICES AND PARTNERSHIPS

MR. FREDERICK ADKINS [*A.*] has acquired the practice of the late A. Percival Starkey at Harrow, Middlesex, and is continuing to practise at Westminster Bank Chambers, Station Road, Harrow-on-the-Hill (Harrow 3716/7). He will be pleased to receive trade catalogues, etc., at that address.

MR. H. AUSTIN BARTON [*A.*] (late Lieut.-Colonel, R.E.) will shortly be resuming practise at 60 High Street, Camberley, Surrey, and Alpha Chambers, Farnborough, Hants. On the retirement of Mr. A. H. Dungay from the firm of Dungay & Barton at that address, Mr. H. A. Barton will practise as H. Austin Barton. In the meantime he will be pleased to receive trade catalogues, etc., at 2B Princess Street, Camberley, Surrey (Camberley 1547).

MR. WILLIAM BEECH [*L.*] has acquired the practice of the late Mr. Ingalton Sanders [*F.*] and Mr. Sanders's practice will be merged into Mr. Beech's established practice at Chamber of Commerce Buildings, Cumberland Place, Southampton (Southampton 2007).

MR. HUGH D. BIDWELL [*A.*], now carrying on the practice of Bennett & Bidwell, is practising at 7 Willian Way, Letchworth, Herts. (Letchworth 373), and *not* at Hall Barn, The Glade, Letchworth, as announced in the September R.I.B.A. JOURNAL.

MR. R. A. NIGEL BIGGAR [*A.*] is carrying on the practice of the late Mr. Roy C. Blampied [*F.*] under the style of Blampied & Biggar at 3 Halkett Place, St. Helier, Jersey, C.I., and will be pleased to receive trade catalogues, etc.

MR. A. GEOFFREY BRENDON [*A.*] has commenced practice at 1 Sussex Street, Plymouth (Plymouth 2458), where he will be pleased to receive trade catalogues, etc.

MR. R. H. CAMERON [*A.*] has entered into partnership with Mr. W. B. Scott, and they will practise under the style of Scott & Cameron at 18 Queen Street, Rhyl, North Wales (Rhyl 1146), where they will be pleased to receive trade catalogues, etc.

MR. T. NELSON CARTWRIGHT, D.S.C. [*F.*] and MR. W. H. GOLIGHTLY [*L.*], upon the retirement of Mr. T. H. Waumsley [*L.*] from the firm of Bromley, Cartwright & Waumsley, 6 Clarendon Street, Nottingham, will practise in partnership under the style of Bromley & Cartwright at the same address, 6 Clarendon Street, Nottingham. They have opened a branch office at 111 London Road, Derby, where they will be pleased to receive trade catalogues, etc.

MR. GEOFFREY CLARK [*L.*] (formerly of Messrs. Harding, Thompson & Partners) has taken into partnership Mr. R. G. M. Chase [*A.*] (late Major, R.E.). They are practising under the style of Geoffrey Clark & Partners at "The Old Rising Sun," The Quay, Wareham, Dorset. They will be pleased to receive trade catalogues, etc., at that address.

COL. E. H. ELEY [*L.*] and MR. J. H. RICKCORD [*L.*], practising under the style of Eley & Allen, 83-85 Powis Street, Woolwich, have changed the name of the firm from 1 October 1946 to Eley & Rickcord, Mr. R. M. Allen [*L.*] having retired in 1943 and Mr. David Eley (late Captain, R.A.) having joined the firm as junior partner.

MR. EDWARD FINCHAM [*A.*] has resumed practise at 9 Palmer's Avenue, Grays, Essex (Tilbury 2146), and will be pleased to receive trade catalogues, etc., at that address.

MR. M. RAINSFORD FLETCHER [*L.*] (late Capt. R.E.) has resumed practise at 13 Ambrose Place, Worthing, Sussex (Worthing 1125), and has taken into partnership Mr. Robert W. Brough [*L.*] (late Lieut. R.N.V.R.). They will practise under the style of M. Rainsford Fletcher & Partners.

MR. E. M. GALLOWAY [*A.*] has commenced private practice at 10 Portland Street, Southampton.

MR. RAMPRAKASH LALCHAND GEHLOTE [*F.*], of Ajmere Gate, Khatiwara, Jaipur City (Rajputana), India, will be pleased to receive trade catalogues, etc., at that address.

HEAD OF SCHOOL OF ARCHITECTURE AND BUILDING, Robert Gordon's Technical College, Aberdeen, will be pleased to receive trade catalogues, etc.

MR. A. D. KNAPTON [*A.*], Architectural Instructor at No. 3 Formation College, Chisledon Camp, Chisledon, Wilts, will be pleased to receive trade catalogues, samples, etc.

MR. NORMAN KEEP [*F.*], Head of the Department of Architecture and Building, Southend-on-Sea Municipal College, will be pleased to receive trade catalogues and data relevant to modern building construction.

MR. DUDLEY G. MARSH [*L.*] is now practising at Westminster Bank Chambers, 40 William Street, Herne Bay, Kent (Herne Bay 433), and will be pleased to receive trade catalogues, etc., at that address.

MR. FRANCIS J. MEESON [*A.*] is now in practice at 131 Lichfield Street, Walsall (Walsall 5796) and will be pleased to receive trade catalogues, etc.

MR. DENIS B. SMITH [*A.*] is now practising at 51 Great George Street, Leeds, 1 (Leeds 26125), and will be pleased to receive trade catalogues, etc.

MESSRS. STANLEY HALL AND EASTON & ROBERTSON [*FF/AAA*] have taken into partnership Mr. S. E. T. Cusdin, O.B.E. [*A.*], Mr. F. Leslie Preston [*A.*] and Mr. R. Maynard Smith [*A.*]. The firm will be known as Easton & Robertson and will continue to practise at 54 Bedford Square, London, W.C.1.

MR. G. A. TAYLOR [*L.*] is practising at 26 Ker Street, Devonport, S. Devonshire, and will be pleased to receive trade catalogues, etc.

CHANGES OF ADDRESS

MR. KENNETH BAYES [*A.*], of Design Research Unit, has removed to 37 Park Street, London, W.1 (Mayfair 9255). He will be pleased to receive trade catalogues, etc., at that address.

MR. ARTHUR R. DANNATT [*L.*] and MR. ANTHONY R. DANNATT [*A.*], practising as A. R. Dannatt & Son, have removed from 43 Duke Street, Chelmsford, to Prudential Buildings, Duke Street, Chelmsford.

MR. HENRY G. KAY [*L.*], practising as Bertie Crewe & Kay, has removed from 75-77 Shaftesbury Avenue, London, W.1, to 1 Green Lane, Hendon, London, N.W.4 (Hendon 2364), where he will be pleased to receive trade catalogues, etc.

MESSRS. OLIVER LAW & PARTNERS [*F/A.*] have removed to 36 Ebury Street, London, S.W.1 (Sloane 2488).

MR. R. F. LOMAX [*A.*] has left 31 Highlands Avenue, Northampton, on his appointment to H.Q. Public Works Department, Freetown, Sierra Leone, W. Africa.

MR. BERNARD LOWE [*L.*] has removed from Morley Lodge, Little Eaton, Derby, to 303 Burton Road, Derby.

MR. LESLIE STUART [*L.*] has removed from 116 Lichfield Court, Richmond, Surrey, to 25 Leigh Heath Court, Leigh-on-Sea, Essex.

MR. JOHN WARE [*S.*] has removed from 18 Gunter Grove, London, S.W.10, to 10 Gunter Grove, London, S.W.10.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

ASSOCIATE, age 33, energetic and of sound character, seeks partnership or post with view to early partnership in established practice. *Not* London.—Apply Box 316, c/o The Secretary, R.I.B.A.

ASSOCIATE (37), with pre-war practice in West Riding of Yorks. seeks partnership in Lancs. or Yorks. in practice of good standing. General experience, specialising in industrial and housing work.—Apply Box 322, c/o The Secretary, R.I.B.A.

ASSOCIATE, ex-Liverpool Student, over 25 years good all-round experience, modern design and construction, good draughtsman, desires change with view to working partnership.—Apply Box 323, c/o The Secretary, R.I.B.A.

ASSOCIATE (External Finals) seeks partnership or appointment leading to partnership in established provincial practice. Good general experience as assistant to private and local authority architects. Apply Box 321, c/o The Secretary, R.I.B.A.

ASSOCIATE offered senior position with view to early partnership in old-established practice in South Yorkshire city. P.A.S.I. (Quantities) an advantage.—Apply Box 320, c/o The Secretary, R.I.B.A.

ASSOCIATE (late Major R.E.) requires partnership in established modern practice. Good connections and with good designing and administrative experience, preferably in London or South Coast.—Apply Box 325, c/o The Secretary, R.I.B.A.

A.A. DIP. (37) seeks partnership or appointment with view to partnership in London. Extensive experience all types work London and provinces. Practised from 1933-42 in London.—Apply Box 331, c/o The Secretary, R.I.B.A.

LONDON PARTNER required by firm practising in London and provinces. Should be aged between 30-35. Qualified and possessing sound knowledge of London practice. Capital required but return would be guaranteed over period of three years.—Apply, with full details of experience and qualifications, to Box 319, c/o The Secretary, R.I.B.A.

PARTNER required by Channel Island architect who seeks early retirement. Small private income an advantage.—Apply Box 330, c/o The Secretary, R.I.B.A.

PARTNERSHIP or post with view to partnership in near future required by ex-officer architect with little capital available, in or near Liverpool, Manchester or Chester. Twenty years' experience in city practices.—Apply Box 327, c/o The Secretary, R.I.B.A.

WANTED AND FOR SALE

FOR SALE. Double-elephant plan chest, combined with 8 ft. long drawing table, with cupboard and footrest. Article at present in Norwich.—Apply Box 317, c/o The Secretary, R.I.B.A.

FOR SALE. Set of drawing instruments, comprising 6 in. compasses with lengthening bar, 6 in. dividers, 4 in. interchangeable spring bows, two drawing pens, etc. Complete in case.—Offers to Box 315, c/o The Secretary, R.I.B.A.

FOR SALE. Good quality drawing papers, No. 34 rolls tracing paper, at 5s. per roll; drawing pencils in various grades, No. 10 loose-leaf ring note-books at 5s. each, Reeve's waterproof drawing inks, various shades; pencils and crayons, various shades.—Apply Box 329, c/o The Secretary, R.I.B.A.

FOR SALE. Two double-elephant drawing-boards, one with ebony slip (Winsor & Newton), one with walnut slip (Harling) in good condition; 2 double-elephant T. squares, almost new. 1 two-fold 5 ft. measuring rod, several dozen pre-war Royal Sovereign and Golden Rod 2H, 2B and small quantity double-elephant and Imperial Whatman paper (some slightly soiled).—Apply Box 324, c/o The Secretary, R.I.B.A.

WANTED TO PURCHASE. "Renaissance de l'architecture Médicale," by Jean Walter; Paris (Massin) 1945.—Apply W. H. Bateman, M.C. [*L.*], Batheaston, Bath, Som.

WANTED, second-hand and in good condition: (1) British Isles and their Vegetation (Tansley); (2) Site Planning in Practice (Thompson); (3) Gardens in Modern Landscape (Tunnard).—Apply Box 326, c/o The Secretary, R.I.B.A.

WIDOW OF MEMBER (Middlesex) has for sale theodolite, tripod and rods.—Apply Box 318, c/o The Secretary, R.I.B.A.

ACCOMMODATION

MEMBER with rapidly growing practice desires to meet another member who has office accommodation in London with view to sharing office and expenses, alternatively a partnership with established firm would be considered.—Apply Box 328, c/o The Secretary, R.I.B.A.

MEMBERS RELEASED FROM THE SERVICES, ETC.

The following members have notified the R.I.B.A. that they have been released from the Services and are resuming practice and would be pleased to receive trade catalogues, information sheets and other data, etc.:—

MR. HARRY MACKAY, M.B.E. [*A.*] (late Major R.E.), c/o Director of Public Works, Nicosia, Cyprus.

MR. P. H. REDKNAP [*A.*], 119 Grange Road, Edinburgh, 9 (Edinburgh 42470).

MR. FRANK RISDON [*A.*], 122 Barnfield Wood Road, Beckenham, Kent.

MR. KEITH P. ROBERTS [*L.*] (late Major, R.E.), 9 George Street West, Luton, Bedfordshire (Luton 3508).

MR. DOUGLAS SMITH, B.A. [*A.*], 10 The Crescent, Northampton.

MR. J. D. WATT [*A.*] is now with the Anglo-Iranian Oil Company, Limited, at Britannic House, Finsbury Circus, London, E.C.2.

MR. KENNETH A. STEVENS [*A.*] (late Major R.E.), "Brindle Bank," Third Acre Rise, Oxford (Cumnor 242).